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predictive damage models, in order to bypass the tedious experimental requirements for generating damage data. The predictive ability of the best of these models, the junction capacitance damage model, is investigated in detail.

Central to this study is a library of experimental damage data for 46 silicon device types, comprising bipolar transistors and diodes tested at the 10-, 1-, and 0.1- μ s pulse durations. These are devices from the front ends of a number of Army systems and represent radio, field wire, and cable functions with operating ranges in the direct current (dc) to microwave region. Of the 46 experimental devices comprising 68 junction types (collector-to-base and emitter-to-base junctions treated as distinct for all transistors), sufficient published manufacturers' data were available for the damage modeling of 11 junctions. These were supplemented with measured parameters for 27 junction types. No measurable difference was observed between the model's predictive capability by using the experimental parameters and that by using manufacturers' model parameters. The ratios of experimental power to damage (for all tested pulse durations) to predicted value span a range from 0.00077 to 18--a skewed distribution, with 59 percent of all predicted values being overestimates of the power to damage.

With only 16 percent of the test-device population having sufficient published parameters to allow the junction capacitance damage model to be used, it is a valuable exercise to develop alternative, simpler damage models--not so much as a substitute for the junction capacitance model, but rather as a standard for comparison. The first considered was the dc power rating model. It was based on the supposition that there is some correlation between dc power ratings and transient power to damage. No distinction was made in the development of this model between forward or reverse dc ratings. The resultant model was applicable to 88 percent of the test-device population (based on published parameters) and demonstrated an agreement with the experimental power-to-damage data that was approximately two to four times poorer than the junction capacitance model. A second model was developed based on the manufacturers' rating of devices as high power or low power. This model considered the entire population of bipolar transistors and diodes (excluding microwave devices) as equatable to either of two devices with damage constants of 0.089 and 6.1 $W\text{-s}^{1/2}$. This model was applicable to 90 percent of the test population and demonstrated the same level of correlation with the experimental damage data as did the junction capacitance damage model.

A comparison of the predictive capability of the junction capacitance damage model with the scatter in the experimental damage data indicates that the use of the failure model requires an order of magnitude larger conservatism in the lower bounding of device failure than the use of an experimentally established damage curve.

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1. INTRODUCTION

Component transient damage data are an integral part of any comprehensive program of electromagnetic pulse (EMP) vulnerability assessment and hardening. In general, semiconductor devices represent the most vulnerable of components and are the devices that have received the most intensive study. With approximately 75,000 bipolar transistor and diode types alone (of which approximately 2000 have military specifications), experimental damage data, data available only as a result of dedicated efforts, can be expected to be available for only a minor fraction of semiconductor devices. This limitation has spurred efforts to bypass the tedious experimental requirements to generate damage data by developing predictive damage models. Three semiempirical damage models are presently in general use.¹ These are designed to predict the failure level of bipolar transistors and diodes under conditions of reverse bias. There is amassed in the literature much information on the predictive ability of these models, much of it sketchy with no well defined standards for drawing a comparison and some of it contradictory. Based on the most exhaustive of these studies, there appears no clearly superior model.²

The purpose of this study is to focus on one of these, the junction capacitance damage model, and to attempt to establish some standards whereby the user can judge its adequacy. Central to this examination is a library of experimental damage data for 59 device types generated for the Army's former Multiple Systems Evaluation Program. These represent transistors and diodes incorporated into the front ends of a number of tactical single and multichannel radios, associated with circuits operating from the direct current (dc) to the microwave region. These data are taken from the unpublished work of Bruno Kalab of the Harry Diamond Laboratories.

This study is a narrowly defined investigation of the predictive ability of the junction capacitance damage model. It must always be borne in mind that, when the adequacy of the model is judged, it must be considered within the context of all sources of error in a program of EMP vulnerability assessment and hardening. Since model accuracy is a subjective quantity to be measured by the particular needs of the user, no conclusions are to be drawn. Rather, a set of standards is to be developed whereby the effectiveness of the model for particular applications can be judged.

¹DNA EMP (Electromagnetic Pulse) Handbook (U), Defense Nuclear Agency DNA 2114H (July 1979). (CONFIDENTIAL)

²D. R. Alexander, G. L. Brown, and J. B. Almassy, Electromagnetic Susceptibility of Semiconductor Components, Air Force Weapons Laboratory AFWL-TR-74-280 (September 1975).

2. EXAMINATION

Most predictive failure models for semiconductors are based on the work by Wunsch and Bell.³ Based on a thermal model for failure, Wunsch and Bell developed the expression

$$P_D = Kt^{-N} \quad , \quad (1)$$

where P_D is the power to failure for a square pulse, K is a constant characteristic of the device (damage constant), t is the duration of the power pulse, and, for the Wunsch-Bell form of equation (1), $N = 0.5$. This value for N is treated as valid for junction reverse bias in at least the 0.1- to 10- μ s range. It was observed that there existed a measure of correlation between power to damage and P-N junction area. From this observation were developed three analytical models for predicting device failure (under reverse bias) based on manufacturers' specifications.⁴ The first two are called thermal resistance models and are based on a simple resistance-capacitance (R-C) network for which heat flow from the junction area is treated as an analog of current, and temperature drop is treated as an analog of electric potential.

The thermal resistance models (incorporated into the Wunsch-Bell equation) are

$$P_D = A_1 \theta_{JC}^{-B_1} t^{-0.5} \quad , \quad (2)$$

$$P_D = A_2 \theta_{JA}^{-B_2} t^{-0.5} \quad , \quad (3)$$

where A_1 , A_2 , B_1 , and B_2 are experimentally determined constants and

$$\theta_{JC} = \frac{T_{J(MAX)} - T_C}{P_D} \quad , \quad (4)$$

³D. C. Wunsch and R. R. Bell, Determination of Threshold Failure Levels of Semiconductor Diodes and Transistors due to Pulse Voltages, IEEE Trans. Nucl. Sci., NS-15 (December 1968), 244-259.

⁴D. C. Wunsch, R. L. Cline, and G. R. Case, Semiconductor Vulnerability, Phase II Report, Theoretical Estimates of Failure Levels of Selected Semiconductor Diodes and Transistors, Braddock, Dunn and McDonald, Inc., Albuquerque, NM, BDM/A-42-69-R (August 1970).

$$\theta_{JA} = \frac{T_{J(MAX)} - T_{AMB}}{P_D} \quad (5)$$

where $T_{J(MAX)}$ is the maximum operating junction temperature and P_D is the total power dissipation at case temperature T_C or ambient temperature T_{AMB} .

The junction capacitance model is based on the relationship between junction area and capacitance. The form of this model (incorporated into the Wunsch-Bell equation) is

$$P_{[1]} = A_3 C_1 v_{BD}^{B_3} t^{-0.5} \quad (6)$$

where A_3 and B_3 are experimentally established constants, C_j is junction capacitance, and V_{BD} is junction breakdown voltage.

To reasonably test model predictions, a representative sample of experimental data is essential. The term "representative" is used advisedly since a small sample taken from a large population must be chosen carefully. All devices are taken from the front ends of an array of Army communications systems. These interface circuits represent radio, field wire, and coaxial cable functions. No devices were prescreened. Instead, all devices were selected on the basis of their proximity to the EMP coupling source with no exclusion on the basis of potential power handling capability, and all devices were chosen without regard to previously published device data. This latter condition insured that all devices were tested employing the same methodology and the same standards. All devices were obtained from federal stocks over a number of years without regard to manufacturer, device lot, or supplier. To the extent that such a selection process defines a general device population selected from among the types of devices of most interest in a transient damage analysis, then the test population can be called representative.

3. RESULTS

This device population (to be referred to as the standard population) was employed in this study:

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Silicon devices

2N326A(C-B)	1N752A	CA3018(E-B)
2N328A(E-B)	PC115	SMB52617(C-B)
2N335(C-B)	1N3026B: JAN	SMB52617(E-B)
2N335(E-B)	1N3611	2N1613: JAN(C-B)
2N336: JAN(C-B)	1N3995A	2N1613: JAN(E-B)
2N336: JAN(E-B)	1N3016B	2N1485: JAN(C-B)
2N2484(C-B)	1N4141	2N1485: JAN(E-B)
2N2484(E-B)	10D2	2N3439(C-B)
2N3736(C-B)	2N2857(C-B)	2N3439(E-B)
2N3736(E-B)	2N2857(E-B)	2N706: JAN(C-B)
2N930(C-B)	2N3375(C-B)	2N706: JAN(E-B)
2N930(E-B)	2N3375(E-B)	1R-69-6735
2N2481(C-B)	2N1490: JAN(C-B)	1N2580
2N2481(E-B)	2N1490: JAN(E-B)	1N571A: JAN
2N2907A(C-B)	2N3584(C-B)	1N485B: JAN
2N2907A(E-B)	2N3584(E-B)	1N2991B: JAN
2N2222A(C-B)	2N2894(C-B)	1N3025B: JAN
2N2222A(E-B)	2N2894(E-B)	MO1054
1N4384	2N5829(C-B)	1N746A: JAN
FS911-3465	2N5929(E-B)	1N645: JAN
1N816	2N3013: JAN(C-B)	1N1202RA: JAN
1N21WE	2N3013: JAN(E-B)	1N1731A: JAN
1N914A	CA3018(C-B)	

Germanium devices

2N404A(C-B)	2N396A(E-B)	2N705: JAN(E-B)
2N404A(E-B)	2N428M: JAN(C-B)	2N465M: JAN(C-B)
2N297A(C-B)	2N428M: JAN(E-B)	2N466M: JAN(E-B)
2N297A(E-B)	2N393: JAN(C-B)	2N1042RA: JAN(C-B)
2N526(C-B)	2N393: JAN(E-B)	2N1042RA: JAN(E-B)
2N526(E-B)	2N501A: JAN(C-B)	1N277: JAN
1N270	2N501A: JAN(E-B)	MS1040
2N396A(C-B)	2N705: JAN(C-B)	

Separate collector-to-base (C-B) and emitter-to-base (E-B) damage characteristics for all transistors yield 91 P-N junction types. Power-to-failure curves are available for these devices in the 0.1- to 10- μ s

range, with some exceptions. If, for the devices with damage data in the aforementioned range, a fit is made to equation (1), the histogram for N given in figure 1 results.

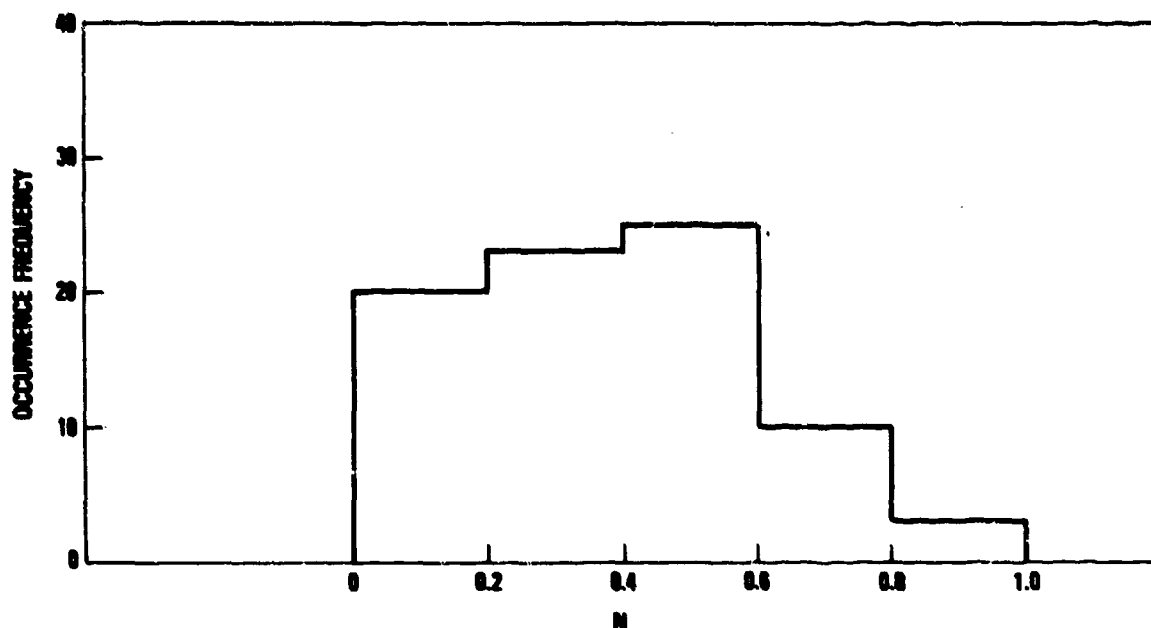


Figure 1. Histogram of N from damage equation $P_D = Kt^{-N}$ for standard population fitted in 0.1- to 10- μ s range.

It will prove important for this study to consider the spread in the standard population power to damage and to have damage values for all tested devices. Because of test equipment limitations, some of the devices were undamageable, particularly for the shortest pulses. All testing was performed about the 0.1-, 1-, and 10- μ s pulse durations. For devices with data missing at the 0.1- μ s pulse duration, it becomes a simple matter to extrapolate from the 1- and 10- μ s data. An examination of all data revealed that extrapolation could be done with a high level of confidence; as a consequence, no distinction is made between these extrapolated data and measured data. For devices with data missing at the 0.1- and 1- μ s pulse durations, extrapolation becomes much less accurate. By relying on equation (1), data at 10 μ s can be used to extrapolate to 0.1 and 1 μ s:

$$\frac{P_D(1 \mu s)}{P_D(10 \mu s)} = \left(\frac{1}{10}\right)^{-N} \quad \text{and} \quad \frac{P_D(0.1 \mu s)}{P_D(10 \mu s)} = \left(\frac{1}{100}\right)^{-N} \quad (7)$$

The choice of N is critical. Figure 1 indicates a value anywhere between 0 and 1. If $N = 0.5$ is chosen, then this results in a maximum error at the 1- μ s pulse duration of a factor of 3.16 and at the 10- μ s pulse duration of a factor of 10. For some devices, the maximum no-damage pulse power is used to improve upon these potential error factors in the choice of extrapolated damage levels. The final situation is no power-to-damage data for any pulse duration. This occurred with a single device (1N3995A). For this device, the junction capacitance model was used to predict damage. The predicted value is compatible with the maximum no-damage power pulse. This compatibility represents the unusual situation of using a model to contribute to a distribution that is part of a test of the model. The predicted value was included since it was considered more important to achieve a complete set of data for the standard device distribution than to be concerned with a single anomalous point. Beyond this distribution, little further use is made of the 1N3995A damage data. The resultant distributions for the standard device population are given in figures 2 through 4. The power-to-damage values for the individual devices are given in appendix A. Sources of uncertainty in the experimental damage data can be classified as these:

a. The natural variability in the levels to failure in any population used to define a damage curve

b. The deviation in the makeup of the test population from that which is representative of a population of interest to the user

There is no way that a study can come to terms with the latter source of uncertainty, except to anticipate the interest of the greatest number of users and to select a population accordingly. The former source can be described by using standard error theory. In anticipation of a more detailed description of the level of variability in the test population later in the report, figure 5 presents as a histogram the range in the data defined as

$$V'/V, \text{ for } V' > V,$$

or

$$V/V', \text{ for } V > V',$$

where V' is the experimental damage data point with the largest deviation from the damage curve and V is the corresponding value from the damage curve. These are values for all device types of the standard test population under reverse bias. Figure 5 represents the maximum deviation from the experimentally defined damage curve for a typical population of 9 to 15 tested components.

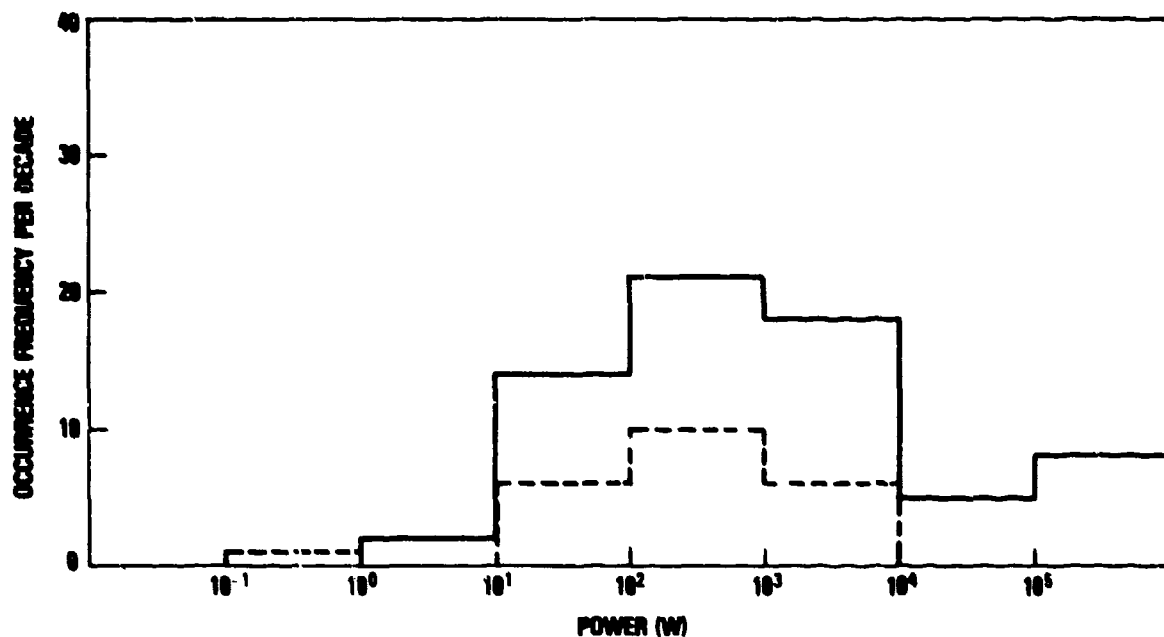


Figure 2. Histogram of experimental power to damage for pulse duration of 0.1 μ s for silicon devices of standard population (solid curve) with superimposed curve for germanium devices (dashed curve).

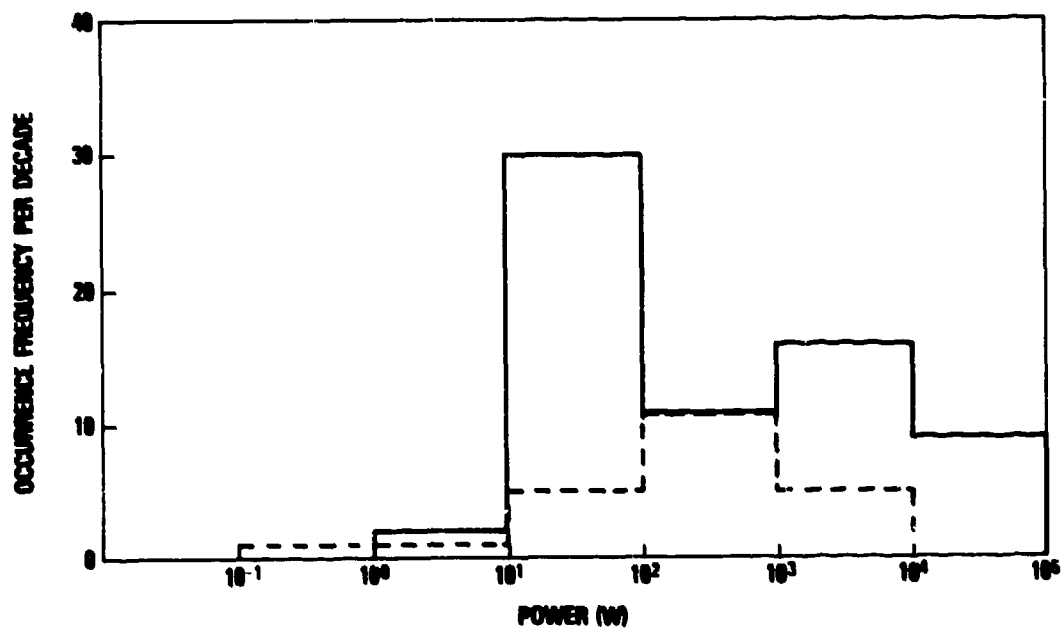


Figure 3. Histogram of experimental power to damage for pulse duration of 1 μ s for silicon devices of standard population (solid curve) with superimposed curve for germanium devices (dashed curve).

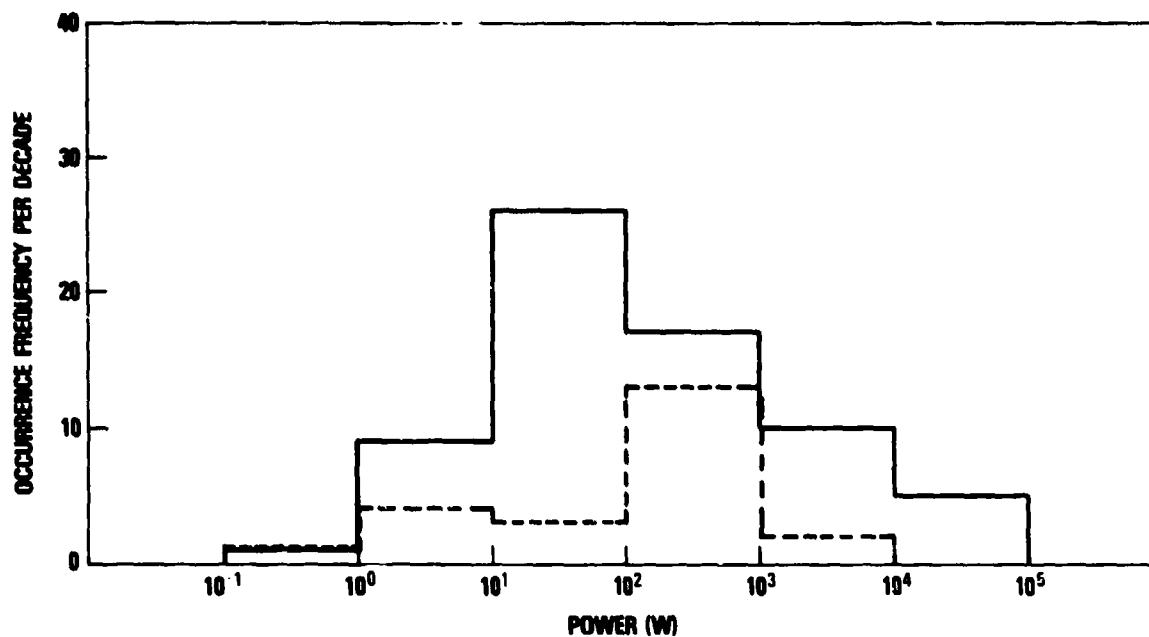


Figure 4. Histogram of experimental power to damage for pulse duration of $10 \mu s$ for silicon devices of standard population (solid curve) with superimposed curve for germanium devices (dashed curve).

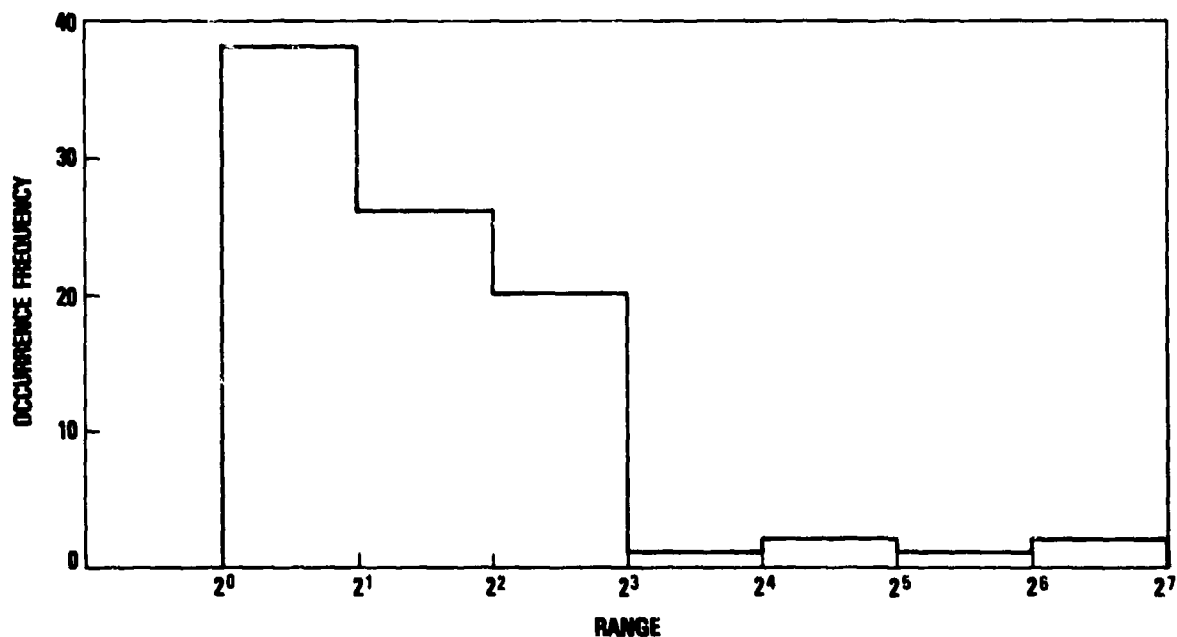


Figure 5. Histogram of maximum deviation of device damage from experimentally established damage curve for all devices of standard population defined as ratio with corresponding point on damage curve.

The most recent form of the junction capacitance damage model, including the experimentally established constants, is given in table 1. A number of difficulties are encountered in applying this model to the standard device population. The model is not applicable to germanium devices. For all silicon transistors, a knowledge of device construction is required--a quantity that is sometimes difficult to obtain from the literature. Similarly, junction capacitance and breakdown voltage are often unobtainable. For transistors, these parameters are rarely available for the base-to-emitter junction. The consequence is that the model, based on published device parameters, is applicable to only 12 percent of the standard device population. If germanium devices are excluded from the standard population, this figure increases to 16 percent. To supplement missing data, experimentally established parameters for junction capacitance and breakdown voltage were employed. These increased the size of the silicon standard population to which the model was applicable to 47 percent.

TABLE 1. JUNCTION CAPACITANCE DAMAGE MODEL

Devices	$K = P t^{1/2}$
Diodes and nonplanar silicon transistors	$K = 4.97 \times 10^{-3} C_J V_{BD}^{0.57}$
Mesa and planar silicon transistors	$K = 1.66 \times 10^{-4} C_J V_{BD}^{0.992}$

Note: For transistors, $C_J = C_{ob}$ and $V_{BD} = BV_{cbo}$.

Source: DNA EMP (Electromagnetic Pulse) Handbook (U), Defense Nuclear Agency DNA 2114H (July 1979). (CONFIDENTIAL)

It has been reported in the literature that little improvement in the predictive capability of this junction capacitance damage model occurs when experimental input parameters are substituted for published values.² This study supports that conclusion. To compare the predictive capability of the model using experimental and published parameters, the data are presented in two formats. The quantities presented are not the predicted values, but rather the scatter in the

²D. R. Alexander, G. L. Brown, and J. B. Almassy, *Electromagnetic Susceptibility of Semiconductor Components*, Air Force Weapons Laboratory AFWL-TR-74-280 (September 1975).

predicted values defined as the ratio of the experimental power to damage to the predicted value. These data are presented as a histogram of the population distribution in figure 6. They are presented also as a function of the percentage confidence level. The percentage confidence level is defined as the percent of the subject population with a scatter less than or equal to the given value. For this mode of presentation, the scatter is given as the spread in the data without regard to whether the predicted value is greater or less than the experimental value. This means that for values of the predicted-to-experimental ratio for damage less than 1, the data presented are the inverse of this ratio. This mode of presentation provides a convenient way to judge the utility of the model based on the varying degrees of confidence required by the diversity of potential model users. The corresponding curves for the experimental and published model parameters are given in figure 7.

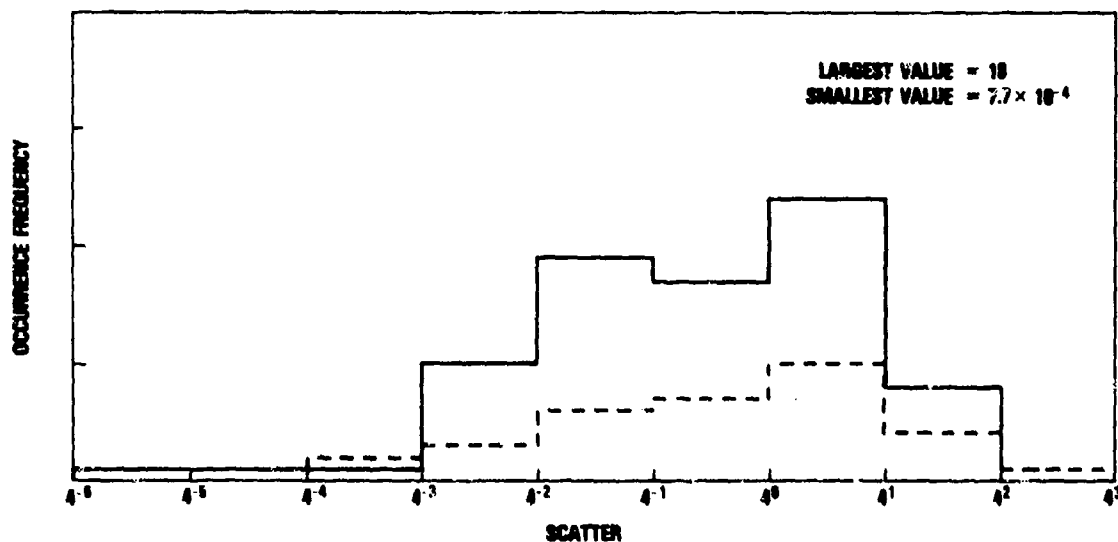


Figure 6. Superimposed histograms of ratio of experimental power to damage to predicted value based on junction capacitance damage model: experimental parameters for junction capacitance and breakdown voltage (solid curve) and manufacturers' parameters (dashed curve).

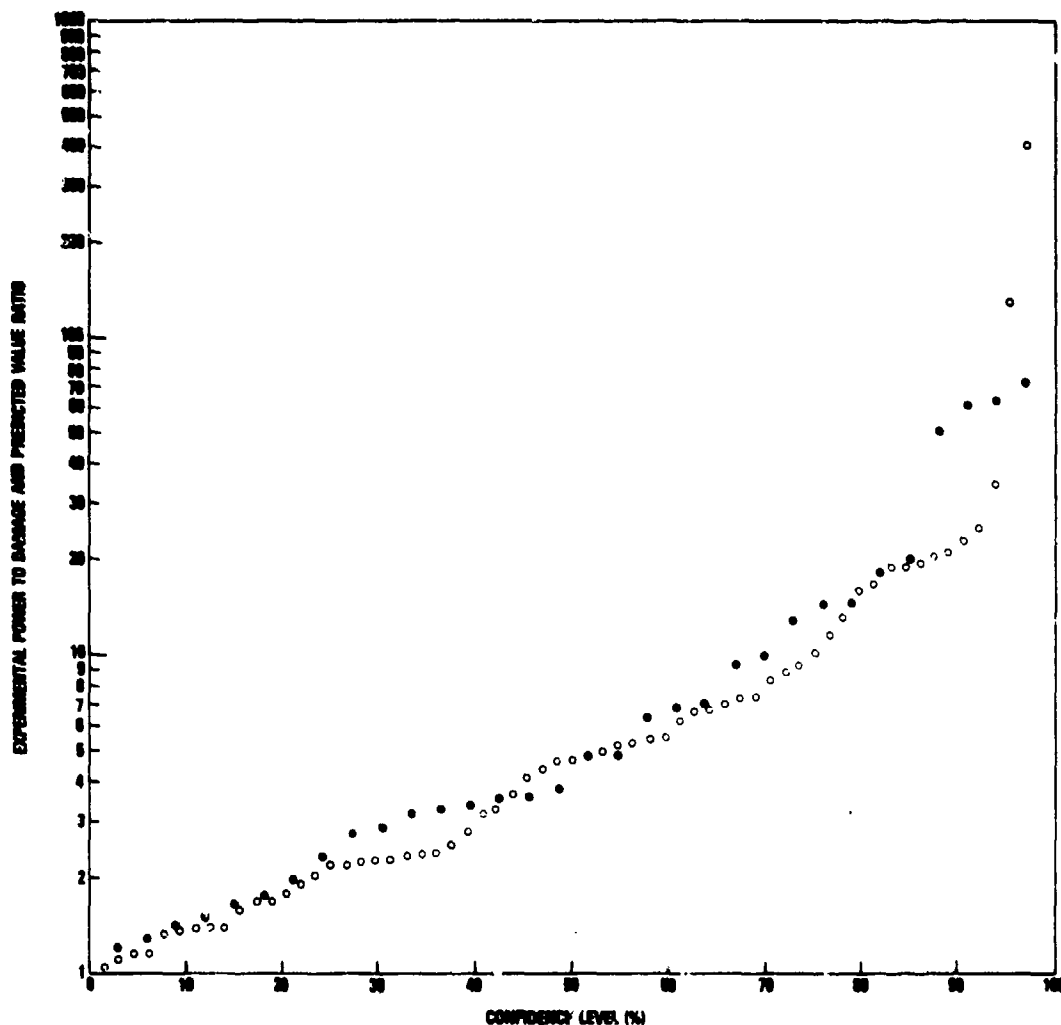


Figure 7. Confidence level for junction capacitance damage model test of standard population: published parameters (solid circles) and experimental values for junction capacitance and breakdown voltage (open circles); all extrapolated values for experimental damage data are excluded from standard population.

All further reference to the predictions of the junction capacitance damage model is to a composite of data corresponding to the model predictions based on experimental parameters plus those several devices not included in this lot for which sufficient published parameters were available. The device population can be ascertained from the data

presented in appendix A. This composite curve is presented in figure 8 for the standard population both including and excluding the extrapolated experimental damage values.

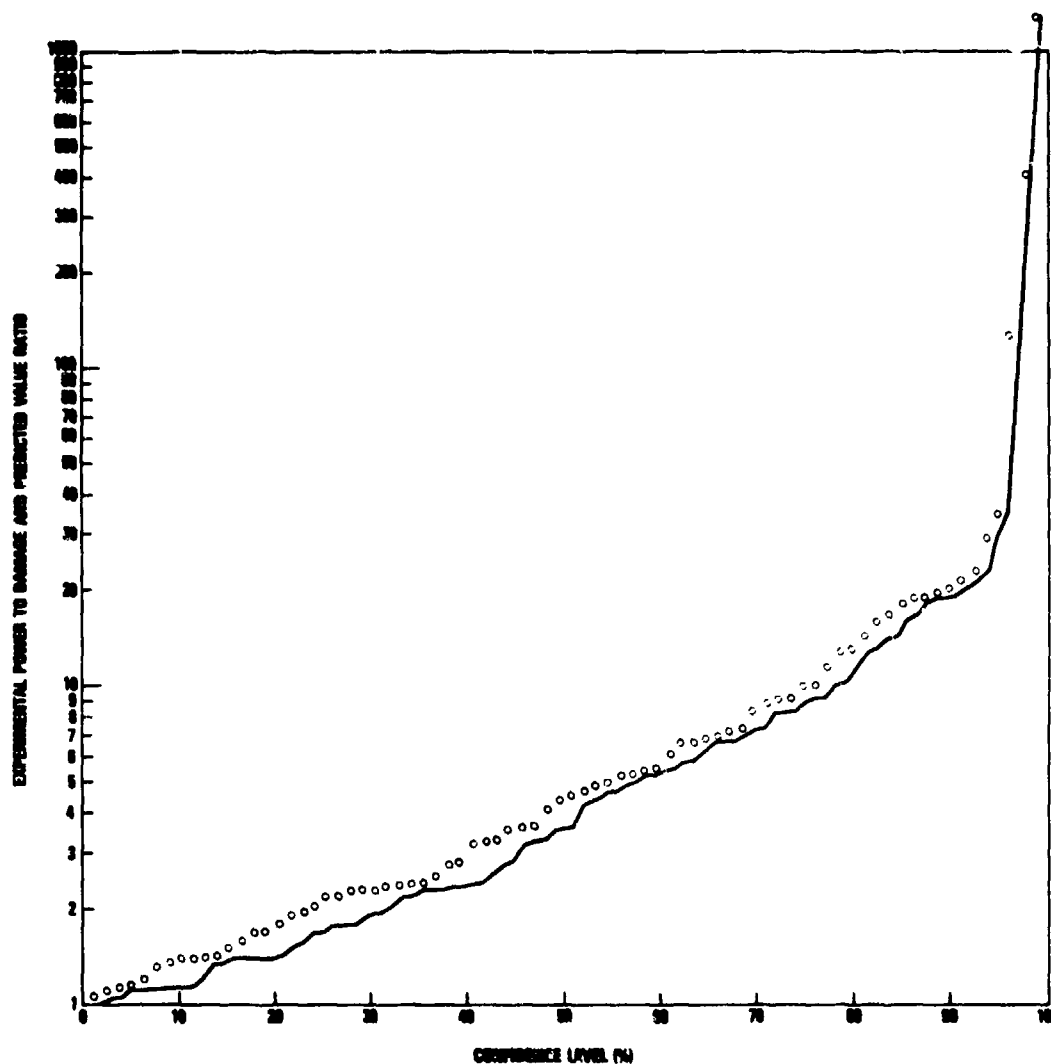


Figure 8. Confidence level for junction capacitance damage model test of composite standard population: all extrapolated values for experimental damage data are excluded from standard population (circles) and extrapolated values are included (solid curve).

Much of the convenience of the junction capacitance model is lost because of the limited availability of the requisite published parameters. It is an informative exercise to test the performance of the junction capacitance model by constructing alternative, simpler damage models. The basis for the junction capacitance damage model was the observation that there appeared to be a correlation between junction area and transient power level to damage. It is not an unreasonable supposition to theorize some measure of correlation between device dc power rating and transient power level to failure. This model is to be referred to as the dc power rating model. Since this model is being proposed not so much as a potentially more accurate substitute, but rather as a standard for comparing the junction capacitance model, rigor is sacrificed for convenience of use and general applicability. Since devices such as rectifiers have power ratings for forward bias and devices such as reference diodes have power ratings for reverse bias, no distinction is to be made between forward or reverse bias in developing the model. For diodes without power ratings, but with a maximum rated current, a power rating is derived by selecting a reasonable corresponding junction potential. Similarly, power ratings for transistors are assumed to apply to the C-B and the E-B junctions. By these standards, sufficient published data are available to apply such a model to 88 percent of the standard silicon device population.

To develop and test the dc power rating model, the standard silicon device population is divided into two groups. Population A (containing approximately half the devices) is that segment lacking sufficient information to apply the junction capacitance damage model, but for which dc power ratings (as previously defined) exist. Population B is the same as population A, but contains those devices to which the junction capacitance damage model is applicable. By using population A to develop the dc power rating model and population B to test its predictive capability, a good comparison of the alternative damage models becomes possible. Since experimental data for constructing the model are available about the 0.1-, 1-, and 10- μ s pulse durations, a particularly simple model to fit these data is of the form

$$P_D/P_{DC} = A_1 t^{-1} + A_2 t^{-1/2} + A_3 \quad , \quad (8)$$

where P_D is the average power to damage for population A devices at pulse duration t and P_{DC} is the corresponding average dc power rating. Although an equation of the form of equation (8) can be readily fitted to the device data, care must be used in extrapolating this relationship beyond the pulse durations used for the fit. For data at 0.1, 1, and 10 μ s, constants A_1 , A_2 , and A_3 become (t in units of s)

$$A_1 = 5.1 \times 10^{-7} \frac{P_D(10 \mu s)}{P_{DC}} - 6.7 \times 10^{-7} \frac{P_D(1 \mu s)}{P_{DC}} \quad (9)$$

$$+ 1.6 \times 10^{-7} \frac{P_D(0.1 \mu s)}{P_{DC}} ,$$

$$A_2 = -2.1 \times 10^{-3} \frac{P_D(10 \mu s)}{P_{DC}} + 2.3 \times 10^{-3} \frac{P_D(1 \mu s)}{P_{DC}} \quad (10)$$

$$- 2.1 \times 10^{-4} \frac{P_D(0.1 \mu s)}{P_{DC}} ,$$

$$A_3 = 1.6 \frac{P_D(10 \mu s)}{P_{DC}} - 0.68 \frac{P_D(1 \mu s)}{P_{DC}} + 0.052 \frac{P_D(0.1 \mu s)}{P_{DC}} . \quad (11)$$

The choice of the ratios of P_D/P_{DC} is based on the nature of the experimental device population. To choose as the ratios of P_D/P_{DC} the average of the selected population requires careful consideration of the definition to be applied to average. The device experimental damage data population is not a normal distribution, and included within this distribution are a number of devices with extrapolated powers to damage. If the average value for P_D/P_{DC} is taken as the arithmetic mean of the distribution, then the error inherent in the extrapolated values, values clustered at the high power end of the distribution, poses the possibility of an average value unrepresentative of the actual population. If the average value is taken as the median value of the distribution, then the uncertainty of the extrapolated values (if their number count is not too large) is eliminated, but at the risk that the median is not the value most representative of the population. Because of these uncertainties, both the arithmetic mean and the median are to be used for all modeling. The values developed to these standards for A_1 , A_2 , and A_3 for population A are given in table 2. The junction capacitance damage model and the dc power rating model applied to population B are compared in figure 9.

The correlation to be drawn between these curves is a function of the confidence level desired in the predictions. It is clearly beyond the scope of this study, being based on a limited data base, to approach the 100-percent level. Although all curves are extended to values approaching 100 percent, this extension is based on very few data

points. The consequence is that caution must be exercised in interpreting into the high confidence region. In the 50- to 90-percent confidence range, the dc power rating model yields a correlation with the experimental power to damage two to four times poorer than the junction capacitance damage model.

TABLE 2. CONSTANTS A_1 , A_2 , AND A_3 FOR
DIRECT CURRENT POWER RATING MODEL P_D/P_{DC}
 $= A_1 t^{-1} + A_2 t^{-1/2} + A_3$

Statistic	A_1 (W-s)	A_2 (W-s ^{1/2})	A_3 (W)
Arithmetic mean	5.58×10^{-4}	0.309	34.2
Median	9.87×10^{-6}	0.101	22.7

An examination of the spread in the junction capacitance damage model predictions and the spread in the damage data of figures 2 to 4 indicates that it should be possible to define two power levels that cover the range of experimental damage data with a spread comparable to that of the junction capacitance model. As an attempt at such a model, which is called the power class model, all devices are classified as either high or low power devices based on published data.* Transistors are routinely classified as either high or low power--the dividing line, with some exceptions, is a power rating of 1 W. If the same 1-W standard is applied to diodes, then the semiconductor population can be divided into two classes. For model development for those diodes without a power rating, all rectifiers, silicon reference diodes, and varistors are considered high power, and the remaining devices are considered low power. This division results in a model applicable to 90 percent of the standard silicon device population.

*The single exception in this model is microwave class devices. Because of their very low power rating, the preferred model is divided into three power categories. With few data available on transient failure of microwave devices (the standard silicon device population contains one microwave device, the 1N21WE), the best that can be done with the present study is to exclude this category.

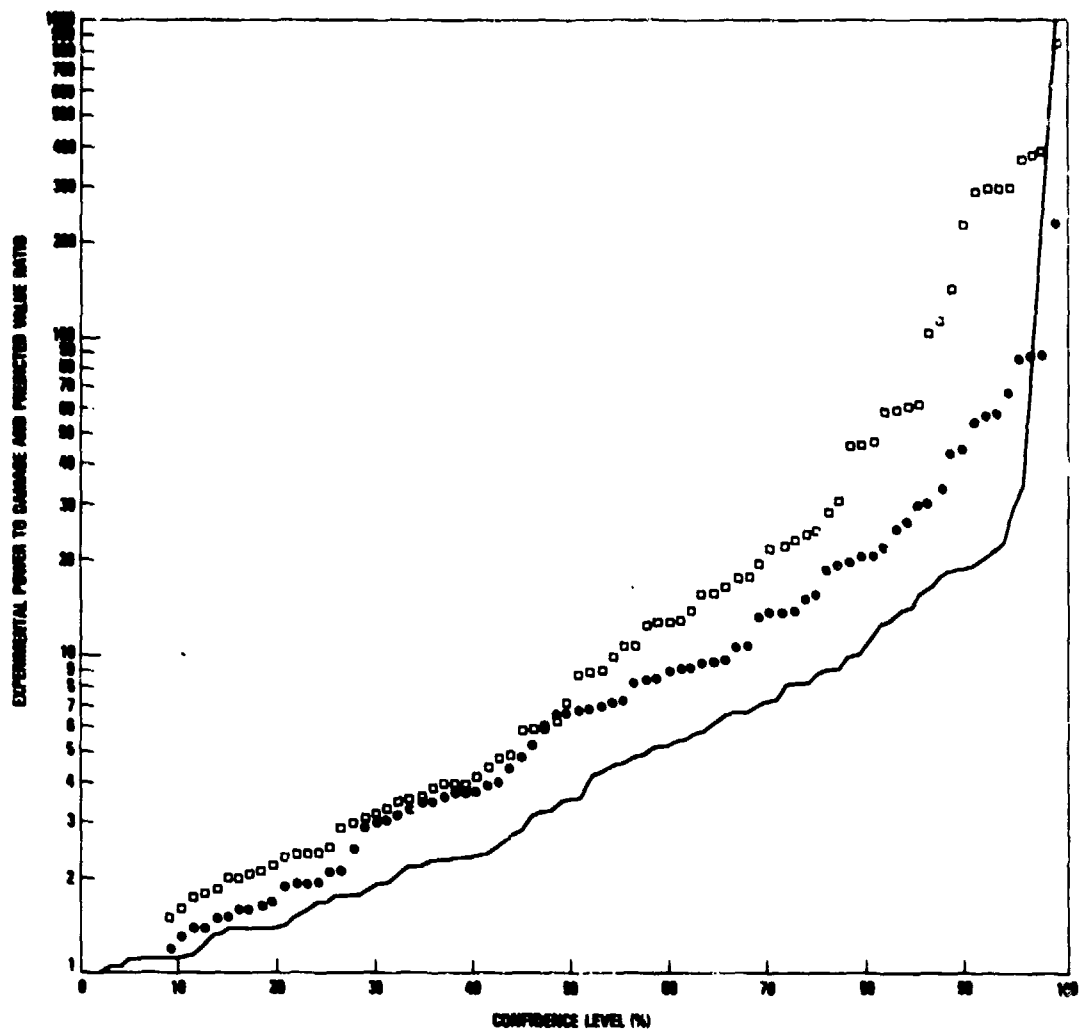


Figure 9. Confidence level for dc power rating model: arithmetic mean used as standard for developing model parameters (solid circles), median values employed (squares), and confidence level for junction capacitance damage model (solid curve).

In the development of this model, the same assumption on the power relation of equation (1) is employed as in the junction capacitance damage model ($N = 0.5$), despite the results of figure 1. In this way, the comparison between models minimizes this factor as a source of error and allows a better comparison between the basic damage models. The model is developed by averaging the experimental powers to damage at the 10- μ s pulse duration for that segment of population A applicable to this

model as previously defined for the high power class and low power class of devices. The average is defined, as previously, as both the arithmetic mean and median values. The Wunsch-Bell relationship of equation (1) is used to calculate the effective damage constant for the high and low power devices.

$$K_H = 3.16 \times 10^{-3} P_H \quad (12)$$

and

$$K_L = 3.16 \times 10^{-3} P_L \quad (13)$$

where K_H and K_L are the damage constants for the high and low power class of devices and P_H and P_L are the corresponding average experimental power to damage at 10 μ s for population A devices. The values for K_H and K_L are given in table 3. Using equations (12) and (13) with the damage constant values of table 3 on population B devices results in the confidence level curves of figure 10 (with the junction capacitance damage model curve included for comparison). There is no appreciable difference in the predictive capability of the junction capacitance damage model and the power class damage model. Included in figure 10 is a fourth curve that represents the scatter in the experimental damage data for all population B devices. This curve is the percentage confidence level that a device selected from among the population B test items has a scatter from the experimentally established damage curves less than or equal to the ordinate value.

TABLE 3. DAMAGE CONSTANTS FOR HIGH AND LOW POWER DEVICES FOR POWER CLASS DAMAGE MODEL

Statistic	Damage constant ($W\text{-s}^{1/2}$)	
	High power	Low power
Arithmetic mean	6.1	0.089
Median	2.2	0.063

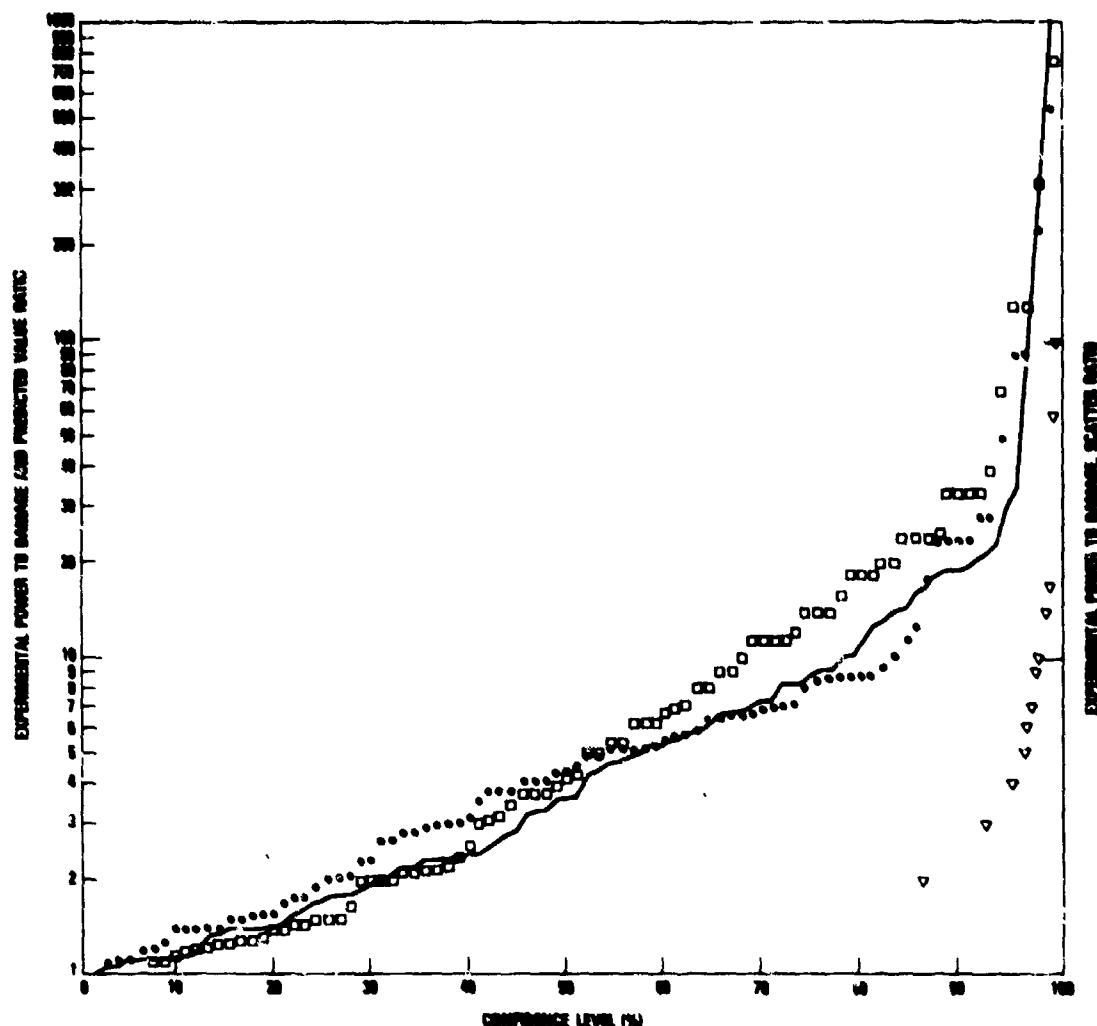


Figure 10. Confidence level for power class damage model: arithmetic mean used as standard for developing model parameters (solid circles), median value employed (squares), confidence level for experimentally established damage curves based on scatter in experimental data (triangles), and junction capacitance damage model confidence level (solid curve).

4. SUMMARY AND FINAL ANALYSIS

Two standards were used to analyze the predictive capability of the junction capacitance damage model. The first was a comparative test based on the development of two alternative, simpler models. Ease of use and general applicability were the criteria for the design of the dc power rating and power class models. These criteria resulted in models

applicable to 88 and 90 percent of the devices of the silicon standard population based on manufacturers' published data compared with 16 percent for the junction capacitance damage model. The dc power rating model was based on the assumption that there exists some measure of correlation between transient level to failure and dc power rating. Since certain classes of devices are rated for forward bias and others are rated for reverse bias, no distinction was made between these conditions for model development.

Despite this nonrigorous mixing of power rating standards, the resultant model provided a level of correlation with the experimental damage data only two to four times poorer than the junction capacitance damage model. The power class model was based on the assumption that all devices (excluding microwave diodes) could be equated to either a high power device with a damage constant of $6.1 \text{ W-s}^{1/2}$ (arithmetic mean) or a low power device with a damage constant of $0.089 \text{ W-s}^{1/2}$ (arithmetic mean). To establish the applicable class for transistors, the manufacturers' catalogings of devices as high or low power were used. Since the dividing line between high and low powers is a rating of 1 W (with some exceptions), the 1-W power rating was used to divide diodes into the applicable classes. The resultant model displayed a level of correlation with the experimental damage data comparable to the level of the junction capacitance damage model. These results do not bode well for the ostensibly more sophisticated junction capacitance damage model.

A second standard to test the predictive capability of the junction capacitance damage model is based on the uncertainty in the failure level of devices resulting from their spread about an experimentally established damage curve. This uncertainty compels the user to place error bars upon the experimental damage data. Also, this uncertainty gives an absolute standard for comparing the junction capacitance damage model. It is standard procedure to define a device failure curve and to bound the lower limit on this curve with a second curve. This lower limit insures a certain measure of confidence that the subject device does not have an actual failure level below the value used. To achieve this same measure of confidence by using predicted failure based on the junction capacitance damage model requires a spread in the low bound approximately one order of magnitude larger than that required of an experimentally determined failure relationship.

In the development of the dc power rating and power class models, some concern must be given to the possibility that the population selected and the standards used produced a fortuitous correlation with the capacitance model. Although the size of the population and the standards used would seem to minimize this possibility, it is a worthwhile exercise to redefine the population and the standards to observe the resultant variation in model predictions. An exhaustive

compendium of such results is given in the appendix. A rigorous comparison among the many predictions is difficult because of the varying standards. Nevertheless, the trend indicates a variation in model predictions, particularly for the power class model, that requires no qualification of the results given in the body of this report.

APPENDIX A.--DAMAGE MODELING COMPUTER CODE

APPENDIX A

Contained within this appendix is a code used to generate many of the data presented in the body of the report and a statistical study of the direct current power rating and power class models based on varying population standards. Included with the code is a single printout of resultant code data. The printout covers only those data for which the arithmetic mean was used for all modeling, and the extrapolated values for experimental power to damage were incorporated into the data base.

Although not indicated in the main body of the report, a study of the performance of the junction capacitance damage model for germanium devices is included. The germanium device model was taken from documentation receiving limited distribution based on a very limited germanium device population. Predictably, the results indicate a much poorer performance of the junction capacitance damage model for the germanium than for the silicon devices.

The nature of the populations and the results for the alternative tests of the proposed models are discernible from the information included in the data output. The quantity of the printed data is indicative of the mass of the data that must be handled in a study of this nature.

APPENDIX A

```

SUBROUTINE SUB1A,B,C,CONST1,CONST2,CONST3)
CONST1=(1-3.162*(B-A)*C-B)/(61.54+10.**5)
CONST2=(10.**5*(B-A)-C*B)/4676.
CONST3=B-(17.**5)*CONST1-(10.**3)*CONST2
RETURN
END
SUBROUTINE SUB2A,K,B,M,C,KC,PRED(T)
DIMENSION B(91,3),D(92)
KV=0
DO 1 N=KC,KA
IF(B(N,1).EQ.0.) GO TO 1
KV=1+KV
D(N)=ABS(B(N,M))
CONTINUE
KB=KV/2
KK=92
DO 2 N=1,NB
BG=0.
D(NK)=0.
DO 3 K=KC,KA
IF(D(K)-LE.BG) GO TO 3
BG=D(K)
KK=K
CONTINUE
C=D(KK)
RETURN
END
SUBROUTINE SUBB(MDD,MCC,E,NC,NO,PMR,PMRL,PMRH)
DIMENSION A(92,1),PMP(91),E(92,1)
DO 1 N=1,92
A(N,1)=ABS(E(N,1))
CONTINUE
NZ=92
DO 404 N=1,MDD
BG=0.
A(NZ,1)=0.
DO 405 N=NC,ND
IF(PMR(N)-NE-1.) GO TO 405
IF(A(N,1)-LE.BG) GO TO 405
BG=A(N,1)
NZ=N
CONTINUE
405 CONTINUE
404 CONTINUE
PMRL=A(NZ,1)
NZ=92
DO 406 N=1,MCC
BG=0.
A(NZ,1)=0.
DO 407 N=NC,ND
IF(PMR(N)-NE-2.) GO TO 407
IF(A(N,1)-LE.BG) GO TO 407
BG=A(N,1)
NZ=N
CONTINUE
407 CONTINUE
406 CONTINUE
PMRH=A(NZ,1)

```

[illegible]

APPENDIX A

A126.N1=D30268(N)
 A127.N1=D3611(N)
 A128.N1=D3995(N)
 A129.N1=D30168(N)
 A130.N1=D4141(N)
 A131.N1=D1002(N)
 C 51 145 DEVICES
 A132.N1=TC2857(N)
 A133.N1=TE2857(N)
 A134.N1=TC3375(N)
 A135.N1=TE3375(N)
 A136.N1=TC1490(N)
 A137.N1=TE1490(N)
 A138.N1=TC3584(N)
 A139.N1=TE3584(N)
 A140.N1=TC2894(N)
 A141.N1=TE2894(N)
 A142.N1=TC5829(N)
 A143.N1=TE5829(N)
 A144.N1=TC3013(N)
 A145.N1=TE3013(N)
 A146.N1=TC3018(N)
 A147.N1=TE3018(N)
 A148.N1=TC5805(N)
 A149.N1=TE5805(N)
 A150.N1=TC1613(N)
 A151.N1=TE1613(N)
 A152.N1=TC1485(N)
 A153.N1=TE1485(N)
 A154.N1=TC3439(N)
 A155.N1=TE3439(N)
 A156.N1=TC706(N)
 A157.N1=TE706(N)
 A158.N1=D1696(N)
 A159.N1=D258(N)
 A160.N1=D751(N)
 A161.N1=D4896(N)
 A162.N1=D29918(N)
 A163.N1=D30252(N)
 A164.N1=D1054(N)
 A165.N1=D746(N)
 A166.N1=D645(N)
 A167.N1=D1202(N)
 A168.N1=D1731(N)
 C 52 DEVICES
 A169.N1=TC404(N)
 A170.N1=TE404(N)
 A171.N1=TC297(N)
 A172.N1=TE297(N)
 A173.N1=TC526(N)
 A174.N1=TE526(N)
 A175.N1=D270(N)
 C 53 145 DEVICES
 A176.N1=TC396(N)
 A177.N1=TE396(N)
 A178.N1=TC420(N)
 A179.N1=TE420(N)
 A180.N1=TC393(N)
 A181.N1=TE393(N)
 A182.N1=TC501(N)

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A(63,N)=TE501AIN)
A(64,N)=TC705IN)
A(65,N)=TE705IN)
A(66,N)=TC466IN)
A(67,N)=TE466IN)
A(68,N)=TC1042IN)
A(69,N)=TE1042IN)
A(70,N)=D277IN)
A(91,N)=D3147IN)
1 CONTINUE
C AIN(1)=EXPERIMENTAL POWER TO DAMAGE AT 10 MICROSECONDS (WATTS)
C AIN(2)=EXPERIMENTAL POWER TO DAMAGE AT 1 MICROSECOND (WATTS)
C AIN(3)=EXPERIMENTAL POWER TO DAMAGE AT 0.1 MICROSECOND (WATTS)
C AIN(4)=CAPACITANCE MODEL DAMAGE CONSTANT (W-51/2) D-A-I-A- PDDX PARM.
C AIN(5)=CAPACITANCE MODEL DAMAGE CONSTANT EXPERIMENTAL PARAMETERS
C AIN(6)=MANUFACTURERS DC POWER RATING
DO 200 N=1,91
  IF(AIN,3).NE.0.) GO TO 200
  IF(AIN,1).NE.0.) GO TO 204
  IF(AIN,5).EQ.0.) GO TO 201
  DAMK=A(M,5)
  GO TO 203
201 IF(AIN,4).EQ.0.) GO TO 202
  DAMK=A(M,4)
  GO TO 203
202 IF(AIN,6).EQ.0.) GO TO 200
  C-VAL(1,2)=AIN(6)*10.-.07-VAL(2,2)*AIN(6)*3162.
  C-VAL(3,2)=AIN(6)
  AIN(2)=-VAL(1,2)*AIN(6)*10.-.06-VAL(2,2)*AIN(6)*1000.
  C-VAL(3,2)=AIN(6)
  AIN(1)=-VAL(1,2)*AIN(6)*10.-.05-VAL(2,2)*AIN(6)*316.2
  C-VAL(3,2)=AIN(6)
  GO TO 200
203 AIN(3)=-DAMK*3162.
  AIN(2)=-DAMK*1000.
  AIN(1)=-DAMK*316.2
  GO TO 200
204 AIN(3)=-10.*AIN(1)
  AIN(2)=-3.16*AIN(1)
200 CONTINUE
DO 206 N=1,91
  IF(AIN,2).LE.0.) GO TO 221
  SLOPEIN(1)=-ALOG10(AIN,1)/AIN(2)
  GO TO 222
221 SLOPEIN(1)=-1.
222 IF(AIN,3).LE.0.) GO TO 223
  SLOPEIN(2)=-ALOG10(AIN,2)/AIN(3)
  GO TO 224
223 SLOPEIN(2)=-1.
224 IF(AIN,3).LE.0.) GO TO 225
  SLOPEIN(3)=-ALOG10(AIN,1)/AIN(3)/2.
  GO TO 206
225 SLOPEIN(3)=-1.
206 CONTINUE
C SLOPE CONTAINS THE POWER FUNCTION FOR THE TIME DEPENDENCY OF POWER TO DAM.
909 FORMAT(2X,102HRA710 OF EXPERIMENTAL POWER TO DAMAGE TO OC POWER MO
808 WRITE(6,808)
809 WRITE(6,809)

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APPENDIX A

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809 FORMAT(IX,I4M,.-ALL DEVICES/6X,22MB.-ALL SILICON DEVICES/
6X,24MC.-ALL GERMANIUM DEVICES/
6X,45MD.-ALL DEVICES WITHOUT CAPACITANCE MODEL DATA/
6X,53ME.-ALL SILICON DEVICES WITHOUT CAPACITANCE MODEL DATA/
6X,55MF.-ALL GERMANIUM DEVICES WITHOUT CAPACITANCE MODEL DATA/
6X,55MH.-ALL SILICON DEVICES NOT INCLUDED WITHIN 145 REPORT/
6X,55HM.-ALL GERMANIUM DEVICES NOT INCLUDED WITHIN 145 REPORT/
6X,49MI.-ALL SILICON DEVICES INCLUDED WITHIN 145 REPORT/
6X,53MJ.-ALL GERMANIUM DEVICES INCLUDED WITHIN 145 REPORT////)
WRITE(6,810)
810 FORMAT(2X,120HFOR ALL CASES WHERE DATA BASE PERMITS, RATIOS ARE ON
ELY FOR THE REMAINING SILICON OR GE DEVICES NOT INCLUDED IN DATA BA
LSE////)
WRITE(6,811)
951 FORMAT(2X,97HA ' ') ENTRY INDICATES NO DATA OR NO CALCULATION
FOR ITEM N, -1 INDICATES NO CALCULATION////)
WRITE(6,812)
254 FORMAT(2X,101HJUNCTION REVERSE BIAS CONDITIONS ONLY NEGATIVE ST
LUN INDICATES ESTIMATED VALUES FOR POWER TO DAMAGE////)
IF(SWITCH-EG-0.0) GO TO 46
WRITE(6,813)
47 FORMAT(2X,42HMEDIAN VALUE USED FOR ALL MODEL DATA BASES////)
GO TO 48
WRITE(6,814)
48 FORMAT(2X,45HARITHMETIC MEAN USED FOR ALL MODEL DATA BASES////)
CONTINUE
IF(PREDCT-NE-0.0) GO TO 50
WRITE(6,815)
51 FORMAT(2X,81HALL PREDICTED VALUES FOR EXP. POWER TO DAMAGE REMOVED
L FROM DATA BASE CALCULATIONS////)
GO TO 52
WRITE(6,816)
50 WRITE(6,817)
53 FORMAT(2X,80HALL PREDICTED VALUES FOR EXP. POWER TO DAMAGE INCLUDE
ED IN DATA BASE CALCULATIONS////)
CONTINUE
WRITE(6,818)
253 FORMAT(25X,14H EXP. POWER .14H EXP. POWER .14H EXP. POWER ,
14H DAM. CONST. .14H DAM. CONST. .14H DC POWER .14H POWER
CLASS)
WRITE(6,819)
270 FORMAT(25X,14H TO DAMAGE .14H TO DAMAGE .14H TO DAMAGE ,
14H DATA BOOK .14H EXPERIMENTAL .14H RATING .14H
GM-2 )
WRITE(6,820)
271 FORMAT(25X,14H AT 10US .14H AT 1US .14H AT 0.1US ,
14H PARAMETERS .14H PARAMETERS .14X,14H
LOW-1 )
WRITE(6,821)
272 FORMAT(25X,14H (WATTS) .14H (WATTS) .14H (WATTS) ,
14H (W-SEC-0.5) .14H (W-SEC-0.5) .14H (WATTS) .14H EXCLUD
ED-0 )
WRITE(6,822)
722 FORMAT(2X,15HSILICON DEVICES)
DO 209 N=1,91
IF(N-NE-69) GO TO 723
WRITE(6,823)
724 FORMAT(2X)
WRITE(6,824)
725 FORMAT(2X,17HGERMANIUM DEVICES)
723 CONTINUE

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APPENDIX A

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KA-4-0(N-1)*1
KB-4-0(N-1)*2
KC-4-0(N-1)*3
KD-4-0(N-1)*4
WRITE(6,203)DEVICE(KA),DEVICE(KB),DEVICE(KC),DEVICE(KD),
      &A(N,M),M=1,6),PU2A(6)
208 FORMAT(16X,4A4,3F14.3,3F14.4,F10.0)
209 CONTINUE
      DO 413 M=1,92
      UCN,11=A(N,1)
      413 CONTINUE
      DO 620 M=1,3
      DO 621 N=1,91
      IF(A(N,6)-EQ.0.) GO TO 621
      IF(A(N,M)-EQ.0.) GO TO 621
      IF(PREDCT-NE.0.) GO TO 90
      IF(A(N,M)-GE.0.) GO TO 90
      B(N,M)=A(N,M)/A(N,6)
      A(N,M)=0.
      GO TO 621
      90 CONTINUE
      B(4,M)=A(N,M)/A(N,6)
      621 CONTINUE
      620 CONTINUE
      WRITE(6,214)
      WRITE(6,622)
      622 FORMAT(12X,CONSTRATIO OF EXPERIMENTAL POWER TO DAMAGE TO DEVICE DC PD
      OVER RATING//)
      WRITE(6,623)
      623 FORMAT(12X,11M 10 USEC ,11M 1 USEC ,11M 0-1 USEC //)
      DO 624 M=1,91
      KA-4-0(N-1)*1
      KB-4-0(N-1)*2
      KC-4-0(N-1)*3
      KD-4-0(N-1)*4
      WRITE(6,625)DEVICE(KA),DEVICE(KB),DEVICE(KC),DEVICE(KD),
      &B(N,M),M=1,3)
      625 FORMAT(16X,4A4,3F11.1)
      624 CONTINUE
      DO 3 M=1,3
      IF(SWITCH-EQ.0.) GO TO 310
      KA=91
      KC=1
      CALL SUBA(KA,B,M,C(M,1),KC,PREDCT)
      GO TO 3
      310 DO 2 M=1,91
      IF(A(N,6)-EQ.0.) GO TO 2
      IF(A(N,M)-EQ.0.) GO TO 2
      A(N,M)=ABS(A(N,M))
      C(M,1)=A(N,M)/A(N,6)*C(M,1)
      PT=1-PT
      2 CONTINUE
      C(M,1)=C(M,1)/PT
      PT=0.
      3 CONTINUE
      CALL SUBC(1,1)*C(2,1),C(3,1),VAL(1,1),VAL(2,1),VAL(3,1))
      DO 22 M=1,3
      DO 23 A=1,91
      IF(A(N,6)-EQ.0.) GO TO 23
      IF(A(N,6)-EQ.0.) GO TO 23

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APPENDIX A

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NN-M-06
A(M,N)=A(M,N)/(C(M,1)*A(M,6))
23 CONTINUE
22 CONTINUE
C VAL(1,1)-(2,1)-(3,1) ARE THE CONSTANTS FOR THE EXPRESSIONS
C P-ALOTOT(-1)*R2OTOT(-5)*R3 FOR ALL DEVICES
PT=0.
DO 4 N=1,3
IF(SWITCH.EQ.0.) GO TO 311
NN-M-07
NC=1
CALL SUBATNA,B,M,C(M,2),KC,PREDCT)
GO TO 4
311 DO 5 N=1,66
IF(A(M,6).EQ.0.) GO TO 5
IF(A(M,1).EQ.0.) GO TO 5
A(M,N)=ABS(A(M,N))
C(M,2)=A(M,N)/A(M,6)+C(M,2)
PT=1.-PT
5 CONTINUE
C(M,2)=C(M,2)/PT
PT=0.
4 CONTINUE
DO 24 N=1,3
DO 25 M=1,66
IF(A(M,1).EQ.0.) GO TO 25
IF(A(M,6).EQ.0.) GO TO 25
NN-M-08
A(M,N)=A(M,N)/(C(M,2)*A(M,6))
25 CONTINUE
26 CONTINUE
C VAL(1,2)-(2,2)-(3,2) ARE CONSTANTS FOR ALL SILICON DEVICES
PT=0.
DO 6 N=1,3
IF(SWITCH.EQ.0.) GO TO 312
NN-M-09
NC=9
CALL SUBATNA,B,M,C(M,3),KC,PREDCT)
GO TO 6
312 DO 7 N=69,91
IF(A(M,6).EQ.0.) GO TO 7
IF(A(M,1).EQ.0.) GO TO 7
A(M,N)=ABS(A(M,N))
C(M,3)=A(M,N)/A(M,6)+C(M,3)
PT=1.-PT
7 CONTINUE
C(M,3)=C(M,3)/PT
PT=0.
6 CONTINUE
C VAL(1,3)-(2,3)-(3,3) ARE CONSTANTS FOR ALL GERMANIUM DEVICES
DO 26 N=1,3
DO 27 M=69,91
IF(A(M,1).EQ.0.) GO TO 27
IF(A(M,6).EQ.0.) GO TO 27
NN-M-12
A(M,N)=A(M,N)/(C(M,3)*A(M,6))
27 CONTINUE
28 CONTINUE

```

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```

PT=0.
DO 8 N=1,3
  IF (SWTCH-EG-0.0) GO TO 313
  NN=0
  DO 314 N=1,91
    IF (AIN-67-EG-0.0) GO TO 314
    IF (AIN-M)-EG-0.0) GO TO 314
    IF (AIN-4)-ME-0.0) GO TO 314
    IF (AIN-5)-ME-0.0) GO TO 314
    NN=N+1
    IF (PREDCT-ME-0.0) GO TO 60
    IF (BIN-M)-LT-0.0) BLEN-M=0.
  GO CONTINUE
  O(M)-ABS(BIN-M))
  314 CONTINUE
  NN=NN+2
  NR=92
  DO 315 N=1,MMN
    EG=0.
    DLEN=0.
    DO 316 N=1,91
      IF (AIN-67-EG-0.0) GO TO 316
      IF (AIN-M)-EG-0.0) GO TO 316
      IF (AIN-4)-ME-0.0) GO TO 316
      IF (AIN-5)-ME-0.0) GO TO 316
      IF (BIN)-LE-0.6) GO TO 316
      EG=0.01
      NR=N
    CONTINUE
  316 CONTINUE
  315 CONTINUE
  C(M,43)=DLEN)
  GO TO 6
  313 DO 9 N=1,91
    IF (AIN-67-EG-0.0) GO TO 9
    IF (AIN-M)-EG-0.0) GO TO 9
    IF (AIN-4)-ME-0.0) GO TO 9
    IF (AIN-5)-ME-0.0) GO TO 9
    A(M,N)=ABS(AIN,M))
    C(M,43)=A(M,N)/A(M,6) * C(M,4)
    PT=1. * PT
  CONTINUE
  C(M,43)=C(M,4)/PT
  PT=0.
  9 CONTINUE
  8 CALL SUBC(1,4),C(12,4),C(13,4),VAL(13,4),VAL(12,4),VAL(13,4))
  C VAL(1,4)-(12,4)-(13,4) ARE CONSTANTS FOR ALL DEVICES WITHOUT CAPACITANCE MODEL
  C DATA
  DO 28 N=1,3
    DO 29 N=1,91
      IF (AIN-M)-EG-0.0) GO TO 29
      IF (AIN-67-EG-0.0) GO TO 29
      IF (AIN-4)-ME-0.0) GO TO 30
      IF (AIN-5)-ME-0.0) GO TO 29
      NN=N+1
      AIN(MN)=AIN,M)/(C(M,4) * AIN,6))
    30 CONTINUE
    29 CONTINUE
    28 DO 10 N=1,3
      IF (SWTCH-EG-0.0) GO TO 317
      NN=0

```

APPENDIX A

```

DO 318 N=1,68
  IF(A(N,6).EQ.0.) GO TO 318
  IF(A(N,M).EQ.0.) GO TO 318
  IF(A(N,4).NE.0.) GO TO 318
  IF(A(N,5).NE.0.) GO TO 318
  MN=1,MN
  IF(PREDCT.NE.0.) GO TO 61
  IF(B(N,M).LT.0.) B(N,M)=0.
  CONTINUE
61 DENI=ABS(B(N,M))
  CONTINUE
  MN=MN/2
  KK=92
  DO 319 K=1,MN
    BK=0.
    D(K)=0.
    DO 320 N=1,68
      IF(A(N,6).EQ.0.) GO TO 320
      IF(A(N,M).EQ.0.) GO TO 320
      IF(A(N,4).NE.0.) GO TO 320
      IF(A(N,5).NE.0.) GO TO 320
      IF(D(N).LE.BK) GO TO 320
      BK=D(N)
    DO 321 N=1,68
      IF(A(N,6).EQ.0.) GO TO 321
      IF(A(N,M).EQ.0.) GO TO 321
      IF(A(N,4).NE.0.) GO TO 321
      IF(A(N,5).NE.0.) GO TO 321
      IF(D(N).LE.BK) GO TO 321
      BK=D(N)
    CONTINUE
  320 CONTINUE
  319 CONTINUE
  C(M,5)=D(KK)
  SQ TO 10
317 DO 11 N=1,68
  IF(A(N,6).EQ.0.) GO TO 11
  IF(A(N,M).EQ.0.) GO TO 11
  IF(A(N,4).NE.0.) GO TO 11
  IF(A(N,5).NE.0.) GO TO 11
  IF(A(N,5).NE.0.) GO TO 11
  A(N,M)=ABS(A(N,M))
  C(M,5)=A(N,M)/A(N,6)*C(M,5)
  PT=1.-PT
  CONTINUE
11 C(M,5)=C(M,5)/PT
  PT=0.
  10 CONTINUE
  CALL SUBC(1,5),C(12,5),C(13,5),VAL(1,5),VAL(2,5),VAL(3,5))
  C VAL(1,5)-(12,5)-(13,5) ARE CONSTANTS FOR SI DEVICES WITHOUT CAP. MODEL DATA
  DO 31 M=1,3
    DO 32 N=1,68
      IF(A(N,M).EQ.0.) GO TO 32
      IF(A(N,6).EQ.0.) GO TO 32
      IF(A(N,4).NE.0.) GO TO 33
      IF(A(N,5).EQ.0.) GO TO 32
      MN=M+18
      A(N,M)=A(N,M)/(C(M,5)*A(N,6))
    CONTINUE
  31 CONTINUE
  DO 12 N=1,3
    IF(SWTCM.EQ.0.) GO TO 321
    MN=0
    DO 322 N=69,91
      IF(A(N,6).EQ.0.) GO TO 322
      IF(A(N,M).EQ.0.) GO TO 322
      IF(A(N,4).NE.0.) GO TO 322
      IF(A(N,5).NE.0.) GO TO 322

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NM=1+NM
IF(PREDCT-ME-O-1) GO TO 62
IF(BIN,M)-LT-O-1 BIN,M)=O.
CONTINUE
62 DIM=ABS(BIN,M))
322 CONTINUE
NM=NM/2
KK=92
DO 323 K=1,NM
  BG=O.
  DKK)=O.
  DO 324 N=69,91
    IF(AIN,M)-EQ-O-1 GO TO 324
    IF(AIN,M)-EQ-O-1 GO TO 324
    IF(AIN,M)-ME-O-1 GO TO 324
    IF(AIN,M)-ME-O-1 GO TO 324
    IF(AIN,M)-LE-BG GO TO 324
    BG=D(M)
  KK=M
  324 CONTINUE
  323 CONTINUE
  C(M,6)=D(KK)
  GO TO 12
321 DO 13 K=69,91
  IF(AIN,M)-EQ-O-1 GO TO 13
  IF(AIN,M)-EQ-O-1 GO TO 13
  IF(AIN,M)-ME-O-1 GO TO 13
  IF(AIN,M)-ME-O-1 GO TO 13
  IF(AIN,M)-LE-BG GO TO 13
  AIN,M)=ABS(AIN,M))
  C(M,6)=AIN,M)/AIN,M)+C(M,6)
  PT=1+PT
  13 CONTINUE
  C(M,6)=C(M,6)/PT
  PT=O.
  12 CONTINUE
  CALL SUBC(1,6),C(2,6),C(3,6),VAL(1,6),VAL(2,6),VAL(3,6))
  VAL(1,6)-(2,6)-(3,6) ARE CONSTANTS FOR GE DEVICES WITHOUT CAP. MODEL DATA
  DO 34 M=1,3
    DO 35 N=69,91
      IF(AIN,M)-EQ-O-1 GO TO 35
      IF(AIN,M)-EQ-O-1 GO TO 35
      IF(AIN,M)-ME-O-1 GO TO 34
      IF(AIN,M)-ME-O-1 GO TO 35
      NM=M+21
      AIN,M)=AIN,M)/(C(M,6)+AIN,M))
    34 CONTINUE
    35 CONTINUE
    DO 14 M=1,3
      IF(SWCH-EQ-O-1) GO TO 325
      KA=31
      KC=1
      CALL SUR(1A,B,M,C(M,7),KC,SWCH)
      GO TO 14
    325 DO 15 M=1,31
      IF(AIN,M)-EQ-O-1 GO TO 15
      IF(AIN,M)-EQ-O-1 GO TO 15
      AIN,M)=ABS(AIN,M))
      C(M,7)=AIN,M)/AIN,M)+C(M,7)
      PT=1+PT
    15 CONTINUE

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APPENDIX A

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C(M,7)=C(M,7)/PT
PT=0.
14 CONTINUE
CALL SUB(C(1,7),C(2,7),C(3,7),VAL(1,7),VAL(2,7),VAL(3,7))
C VAL(1,7)-(2,7)-(3,7) ARE CONSTANTS FOR SI DEVICES NOT IN 145 REPORT
DO 37 M=1,3
DO 38 N=32,68
IF(A(M),EQ,0.1) GO TO 38
IF(A(M),EQ,0.1) GO TO 38
MM=M+24
A(M,MM)=A(M,M)/(C(M,7)+A(M,6))
38 CONTINUE
37 CONTINUE
DO 17 M=1,3
IF(SWITCH-EQ,0.1) GO TO 326
KA=75
KC=69
CALL SUB(A(KA,B,M),C(M,6),KC,SWITCH)
GO TO 17
326 DO 16 N=69,75
IF(A(M,6),EQ,0.1) GO TO 16
IF(A(M,6),EQ,0.1) GO TO 16
A(M,M)=ABS(A(M,M))
C(M,6)=A(M,M)/A(M,6)+C(M,6)
PT=1-PT
16 CONTINUE
C(M,6)=C(M,6)/PT
PT=0.
17 CONTINUE
CALL SUB(C(1,8),C(2,8),C(3,8),VAL(1,8),VAL(2,8),VAL(3,8))
38 VAL(1,8)-(2,8)-(3,8) ARE CONSTANTS FOR CE DEVICES NOT IN 145 REPORT
DO 39 M=1,3
DO 40 N=76,91
IF(A(M),EQ,0.1) GO TO 40
IF(A(M),EQ,0.1) GO TO 40
MM=M+27
A(M,MM)=A(M,M)/(C(M,8)+A(M,6))
40 CONTINUE
39 CONTINUE
DO 18 M=1,3
IF(SWITCH-EQ,0.1) GO TO 327
KA=68
KC=32
CALL SUB(A(KA,B,M),C(M,9),KC,SWITCH)
GO TO 18
327 DO 19 N=32,68
IF(A(M,6),EQ,0.1) GO TO 19
IF(A(M,6),EQ,0.1) GO TO 19
A(M,M)=ABS(A(M,M))
C(M,9)=A(M,M)/A(M,6)+C(M,9)
PT=1-PT
19 CONTINUE
C(M,9)=C(M,9)/PT
PT=0.
18 CONTINUE
CALL SUB(C(1,9),C(2,9),C(3,9),VAL(1,9),VAL(2,9),VAL(3,9))
C VAL(1,9)-(2,9)-(3,9) ARE CONSTANTS FOR SI DEVICES INCLUDED IN 145 REPORT
DO 41 M=1,3
DO 42 N=3,31
IF(A(M),EQ,0.1) GO TO 42

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```

IF (A(N,6)) - EQ,0 -) GO TO 42
MM=M+30
A(N,MM)=A(N,M)/(C(M,9)*A(N,6))
42 CONTINUE
41 CONTINUE
DO 20 M=1,3
IF (SWTCH-EQ,0 -) GO TO 328
KA=91
KC=76
CALL SUBA(KA,B,M,C(M,10),KC,SWTCH)
GO TO 20
328 DO 21 M=76,91
IF (A(N,6)) - EQ,0 -) GO TO 21
IF (A(N,M)) - EQ,0 -) GO TO 21
A(N,M)=ABS(A(N,M))
C(M,10)=A(N,M)/A(N,6)+C(M,10)
PT=1.0*PT
21 CONTINUE
C(M,10)=C(M,10)/PT
PT=2.
20 CONTINUE
CALL SUBA(C(1,10),C(2,10),C(3,10),VAL(1,10),VAL(2,10),VAL(3,10))
C VAL(1,10)-(2,10)-(3,10) ARE CONSTANTS FOR GE DEVICES INCLUDED IN 145 REPORT
DO 43 M=1,3
DO 44 N=69,75
IF (A(N,M)) - EQ,0 -) GO TO 44
IF (A(N,6)) - EQ,0 -) GO TO 44
MM=M+33
A(N,MM)=A(N,M)/(C(M,10)*A(N,6))
44 CONTINUE
43 CONTINUE
DO 337 M=1,3
DO 338 N=1,9
A(N,M)=ABS(A(N,M))
338 CONTINUE
337 CONTINUE
DO 500 M=1,3
CS=100.03.16200H
DU 501 M=1,91
MM=M+36
IF (A(N,4)) - EQ,0 -) GO TO 501
IF (A(N,M)) - EQ,0 -) GO TO 501
A(N,MM)=A(N,M)/(A(N,4)*CS)
501 CONTINUE
500 CONTINUE
DO 502 M=1,3
CS=100.03.16200H
DO 503 M=1,91
MM=M+39
IF (A(N,5)) - EQ,0 -) GO TO 503
IF (A(N,M)) - EQ,0 -) GO TO 503
A(N,MM)=A(N,M)/(A(N,5)*CS)
503 CONTINUE
502 CONTINUE
DO 511 M=1,3
CS=100.03.16200H
DU 512 M=1,91
MM=M+42
IF (A(N,5)) - EQ,0 -) GO TO 513
IF (A(N,M)) - EQ,0 -) GO TO 512

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513  A0M,MN3=A0M,M7/6A0M,5)C5)
      GO TO 512
      IF (A0M,4)EQ.0.1 GO TO 512
      IF (A0M,5)EQ.0.1 GO TO 512
      A0M,MN3=A0M,M7/6A0M,4)C5)
512  CONTINUE
511  CONTINUE
      WRITE(6,214)
      FORMAT(2X,////)
      WRITE(6,260)
      WRITE(6,255)
      FORMAT(2X,11M A ,11M D
      C ,11M B ,11M C ,11M D
215  FORMAT(22X,11M 10 USEC ,
      CEC ,11M 1 USEC ,11M 0
      C11M 0.1 USEC ,11M 10 USEC
      DD 213 M=1,91
      KA=40M-1101
      KB=40M-1102
      KC=40M-1103
      KD=40M-1104
      WRITE(6,210)DEVICE(KA),DEV
      C(A0M,M7,M=7,16)
210  FORMAT(16X,40A,10F11.5)
211  CONTINUE
      WRITE(6,214)
      WRITE(6,256)
      FORMAT(22X,11M D ,11M
      C ,11M E ,11M C
212  CONTINUE
      WRITE(6,257)
      FORMAT(22X,11M 1 USEC ,
      CEC ,11M 0.1 USEC ,11M 1
      C11M 10 USEC ,11M 1 USEC
      DD 212 M=1,91
      KA=40M-1101
      KB=40M-1102
      KC=40M-1103
      KD=40M-1104
      WRITE(6,210)DEVICE(KA),DEV
      C(A0M,M7,M=7,20)
212  CONTINUE
      WRITE(6,214)
      WRITE(6,260)
      FORMAT(22X,11M C ,11M J
      C11M 1 ,11M J
213  CONTINUE
      WRITE(6,291)
      FORMAT(22X,11M 0.1 USEC ,
      CSEC ,11M 10 USEC ,11M 10
      C11M 1 USEC ,11M 0.1 USEC
      DD 213 M=1,91
      KA=40M-1101
      KB=40M-1102
      KC=40M-1103
      KD=40M-1104
      WRITE(6,210)DEVICE(KA),DEV
      C(A0M,M7,M=27,30)
213  CONTINUE

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WRITE(6,214)
WRITE(6,888)
888 FORMAT(2X,104HN VALUE FOR RELATIONSHIP: K-POW(4-M) DERIVED FROM E
      EXPERIMENTAL DAMAGE DATA FOR TIME INTERVALS INDICATED//)
WRITE(6,330)
330 FORMAT(2X,11H K ,11H K ,11H K ,11H K )
917 WRITE(6,917)
917 FORMAT(2X,11H 10-1 USEC ,11H 1-1 USEC ,11H 10-1 USEC//)
DO 250 N=1,91
KA=4*(N-1)+1
KB=4*(N-1)+2
KC=4*(N-1)+3
KD=4*(N-1)+4
WRITE(6,251) DEVICE(KA),DEVICE(KB),DEVICE(KC),DEVICE(KD),
      SLOPE(N,M),M=1,3)
251 FORMAT(6X,4A4,3F11.5)
250 CONTINUE
WRITE(6,214)
IF(SWITCH.EQ.0.1) GO TO 415
WRITE(6,416)
416 FORMAT(2X,83HEATON VALUES FOR QUANTITIES A THROUGH J FOR PULSE DU
      RATIONS OF 10, 1, AND 0.1 USEC//)
GO TO 417
415 WRITE(6,418)
418 FORMAT(2X,92HARITHMETIC MEAN VALUES FOR QUANTITIES A THROUGH J FOR
      PULSE DURATIONS OF 10, 1, AND 0.1 USEC//)
417 CONTINUE
1121 FORMAT(10X,3E12.2)
WRITE(6,1121)C(M,1),M=1,3)
WRITE(6,1121)C(M,2),M=1,3)
WRITE(6,1121)C(M,3),M=1,3)
WRITE(6,1121)C(M,4),M=1,3)
WRITE(6,1121)C(M,5),M=1,3)
WRITE(6,1121)C(M,6),M=1,3)
WRITE(6,1121)C(M,7),M=1,3)
WRITE(6,1121)C(M,8),M=1,3)
WRITE(6,1121)C(M,9),M=1,3)
1121 FORMAT(10X,3E12.2)
WRITE(6,1121)C(M,10),M=1,3)
WRITE(6,306)
WRITE(6,551)
551 FORMAT(20X,76HPower TO DAMAGE EQUATION COEFFICIENTS FOR POPULATION
      S DEFINED BY A THROUGH J//)
WRITE(6,552)
552 FORMAT(4X,1H -1 -1/2)
553 FORMAT(4X,26HP = K1 T + K2 T + K3//)
WRITE(6,554)
554 FORMAT(10X,36H K1 K2 K3 //)
DO 556 N=1,10
WRITE(6,557)VAL(1,M),VAL(2,M),VAL(3,M)
557 FORMAT(10X,3E12.3)
556 CONTINUE
WRITE(6,214)
WRITE(6,504)
WRITE(6,509)
WRITE(6,510)
504 FORMAT(2X,124RATIO OF EXPERIMENTAL POWER TO DAMAGE TO PREDICTED V
      ALUE BASED ON JUNCTION CAPACITANCE MODEL: L-MODEL BASED ON D-A.T.A
      L. (JOK)
509 FORMAT(2X,124PARAMETERS M-MODEL BASED ON EXPERIMENTAL PARAMETE

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APPENDIX A

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ERS  N-MODEL BASED ON EXPERIMENTAL PARAMETERS AND, WHERE DATA MIS
LSING, )
510 FORMAT(2X,33HBASED ON D-A-T-A. BOOK PARAMETERS)
WRITE(6,505)
505  FORMAT(22X,11H  L  ,11H  L  ,11H  L  ,11H  L  ,11H  M  ,
      ,11H  M  ,11H  M  ,11H  N  ,11H  N  ,
      ,11H  M  //)
WRITE(6,506)
506  FORMAT(22X,11H  10 USEC  ,11H  1 USEC  ,11H  0.1 USEC  ,11H  10 US
      SEC  ,11H  1 USEC  ,11H  0.1 USEC  ,11H  10 USEC  ,11H  1 USEC  ,
      ,11H  0.1 USEC //)
DD 507 N=1,91
KA=4*(N-1)+1
KB=4*(N-1)+2
KC=4*(N-1)+3
KD=4*(N-1)+4
WRITE(6,508)DEVICE(NA),DEVICE(NB),DEVICE(NC),DEVICE(ND),
      CLAIM,N=37,45)
508  FORMAT(6X,44,9F11.5)
507  CONTINUE
DD 410 N=69,91
DD 411 N=37,45
A(N,M)=0.
411  CONTINUE
410  CONTINUE
DD 375 NJ=1,2
      IF(KJ.EQ.1) GO TO 378
DD 379 NZ=1,91
      PWR(NZ)=PWR(NZ)
379  CONTINUE
      GO TO 380
378  DD 381 NZ=1,91
      PWR(NZ)=PWR(NZ)
381  CONTINUE
380  IF(KJ.EQ.1) GO TO 376
      KO=18
      GO TO 377
376  KO=0
377  DD 360 KK=1,3
      DO=0.
      CC=0.
      PWRB=0.
      PWRH=0.
      PWRLA=0.
      PWRHA=0.
      PWRLB=0.
      PWRHB=0.
      IF(KK-21361,362,363
361  ND=91
      NC=1
      GO TO 364
362  ND=68
      NC=1
      GO TO 364
363  ND=91
      NC=69
364  IF(SWITCH.EQ.0.1) GO TO 400
      DD 401 N=NC,ND
      IF(PWR(NJ)-1.1) 401,402,403
402  DD=1.0DD

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403 GO TO 401
404 CC=1+CC
405 CONTINUE
406 NDD=DD/2-
407 MCC=CC/2-
408 NZ=92
409 CALL SUBR(MDD,MCC,U,MC,ND,PWR,PML,PWRH)
410 GO TO 408
411 DO 340 N=MC,ND
412 IF(PWR(N)-1.1340,341,342)
413 DD=1+DD
414 PML=AIN,1)+PML
415 GO TO 340
416 CC=1+CC
417 PWRH=AIN,1)+PWRH
418 CONTINUE
419 PML=PML/DD
420 PWRH=PWRH/CC
421 PMLA=PML/(1.0E-05)+(-4)
422 PWRHA=PWRH/(1.0E-05)+(-4)
423 PMLB=PML/(1.0E-05)+(-5)
424 PWRHB=PWRH/(1.0E-05)+(-5)
425 WRITE(6,3014)PMLB,PWRHB
426 FORMAT(2X,2E14,3)
427 DO 347 K=1,2
428 DO 343 N=1,3
429 IF(K.EQ.1) GO TO 348
430 MM=45+M*(6+(KK-1))+KD
431 EXP=100+.03.162+MM
432 PML=PMLB
433 PWRH=PWRHB
434 GO TO 349
435 MM=45+M*(6+(KK-1))+KD
436 EXP=100+.02.512+MM
437 PML=PMLA
438 PWRH=PWRHA
439 DO 344 N=MC,ND
440 IF(KJ.EQ.1) GO TO 450
441 IF(PWR(N)-.1) GO TO 344
442 PWR(N)=PWR(N)
443 IF(PWR(N)-1.1344,345,346)
444 AIN(MM)=AIN(MM)/(PML*EXP)
445 GO TO 344
446 AIN(MM)=AIN(MM)/(PWRH*EXP)
447 CONTINUE
448 IF(KJ.EQ.1) GO TO 460
449 DO 461 N=MC,ND
450 PWR(N)=PWR(N)
451 CONTINUE
452 CONTINUE
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1000 CONTINUE

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C FOR PWRB: LOW POWER DEVICES-1, HIGH POWER-2, EXCLUDED-J
C FOR PWRB: SAME AS PWRB EXCEPT LIMITED TO DEVICES WITHOUT CAPACITANCE DAMAGE
C MODEL DATA
WRITE(6,214)
WRITE(6,250)
350 FORMAT(2X,125HQ= EXPERIMENTAL POWER TO DAMAGE/FA*000(-4), WHERE K

APPENDIX A

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LA DAMAGE CONSTANT BASED ON HIGH POWER OR LOW POWER RATING FOR ALL
(DEVICES)
WRITE(6,351)
351 FORMAT(2X,125HP= EXPERIMENTAL POWER TO DAMAGE/KA*10-6(1-5), WHERE K
LA DAMAGE CONSTANT BASED ON HIGH POWER OR LOW POWER RATING FOR ALL
(DEVICES)
WRITE(6,352)
352 FORMAT(2X,43HQ= SAME AS D EXCEPT FOR SILICON DEVICES ONLY)
WRITE(6,353)
353 FORMAT(2X,43HR= SAME AS P EXCEPT FOR SILICON DEVICES ONLY)
WRITE(6,354)
354 FORMAT(2X,45HS= SAME AS D EXCEPT FOR GERMANIUM DEVICES ONLY)
WRITE(6,355)
355 FORMAT(2X,45HT= SAME AS P EXCEPT FOR GERMANIUM DEVICES ONLY)
WRITE(6,356)
356 FORMAT(2X,11H U, 11H O, 11H O, 11H O, 11H Y
C 11H O 11H Q //)
WRITE(6,357)
357 FORMAT(2X,11H 10 USEC, 11H 1 USEC, 11H 0.1 USEC,
C 11H 10 USEC, 11H 1 USEC, 11H 0.1 USEC,
C 11H 10 USEC, 11H 1 USEC, 11H 0.1 USEC //)
DO 358 N=1,91
KA=6*(N-1)+1
KB=6*(N-1)+2
KC=6*(N-1)+3
KD=6*(N-1)+4
WRITE(6,359)DEVICE(KA),DEVICE(KB),DEVICE(KC),DEVICE(KD),
C (KA,N),M=46,54)
CONTINUE
4 358
WRITE(6,361)
361 FORMAT(2X,11H R, 11H S, 11H T, 11H Y, 11H Z
C 11H Y 11H T //)
WRITE(6,362)
DO 371 N=1,91
KA=6*(N-1)+1
KB=6*(N-1)+2
KC=6*(N-1)+3
KD=6*(N-1)+4
WRITE(6,363)DEVICE(KA),DEVICE(KB),DEVICE(KC),DEVICE(KD),
C (KA,N),M=55,63)
CONTINUE
371
359 FORMAT(1X,4A4,9F11.3)
WRITE(6,362)
362 FORMAT(2X,82HV= SAME AS D EXCEPT MODEL LIMITED TO DEVICES WITHOUT
CAPACITANCE DAMAGE MODEL DATA)
WRITE(6,363)
363 FORMAT(2X,82HV= SAME AS P EXCEPT MODEL LIMITED TO DEVICES WITHOUT
CAPACITANCE DAMAGE MODEL DATA)
WRITE(6,364)
364 FORMAT(2X,82HV= SAME AS D EXCEPT MODEL LIMITED TO DEVICES WITHOUT
CAPACITANCE DAMAGE MODEL DATA)
WRITE(6,365)
365 FORMAT(2X,82HX= SAME AS R EXCEPT MODEL LIMITED TO DEVICES WITHOUT
CAPACITANCE DAMAGE MODEL DATA)
WRITE(6,366)
366 FORMAT(2X,82HY= SAME AS S EXCEPT MODEL LIMITED TO DEVICES WITHOUT
CAPACITANCE DAMAGE MODEL DATA)

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387 WRITE(6,307)
   FORMAT(2X,B2HZ= SAME AS T EXCEPT MUGZ= LIMITED TO DEVICES WITHOUT
   CAPACITANCE DAMAGE MODEL DATA//)
388 WRITE(6,308)
   FORMAT(22X,11M U ,11M V ,11M U ,11M U ,
   11M V ,11M W ,11M Z ,11M //)
   WRITE(6,357)
   DO 309 N=1,91
   KA=4*(N-1)+1
   KB=4*(N-1)+2
   KC=4*(N-1)+3
   KD=4*(N-1)+4
   WRITE(6,359)DEVICE(NA),DEVICE(NB),DEVICE(NC),DEVICE(KD),
   ((A(N,M),M=64,72)
389 CONTINUE
   WRITE(6,214)
   WRITE(6,391)
391 FORMAT(22X,11M X ,11M Y ,11M X ,11M X ,
   11M Y ,11M Z ,11M Z ,11M //)
   WRITE(6,357)
   DO 392 N=1,91
   KA=4*(N-1)+1
   KB=4*(N-1)+2
   KC=4*(N-1)+3
   KD=4*(N-1)+4
   WRITE(6,359)DEVICE(NA),DEVICE(NB),DEVICE(NC),DEVICE(KD),
   ((A(N,M),M=73,81)
392 CONTINUE
   DO 394 N=1,91
   DO 394 M=1,41
   A(N,M)=ABS(SIN(M))
   V(N,M)=A(N,M)
394 CONTINUE
423 DO 299 N=1,25
   KK=1
   BB=0.
   MA=3*M+4
   S(1,M)=A(1,MA)
302 DO 300 N=1,3
   MA=MA+K-1
   DO 301 N=1,91
   IF(A(N,MA).LE.SINR,M)) GO TO 301
   SINR,M)=A(N,MA)
   BB=1.
   MZ=N
   MAZ=MA
301 CONTINUE
300 CONTINUE
   IF(BB.EQ.0.) GO TO 299
   A(MZ,MAZ)=0.
   BB=0.
   KK=1+KK
   GO TO 302
299 CONTINUE
   WRITE(6,214)
   WRITE(6,280)
280 FORMAT(5X,59HQUANTITIES A THROUGH J AND L THROUGH Z ORDERED BY MAG
   NITUDE////)

```

APPENDIX A

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412 WRITE(6,*)121
   FORMAT(5X,36HSILICON DEVICES ONLY FOR L, M, AND N)
   IF(KABC.NE.1) GO TO 424
   WRITE(6,*)425
425 FORMAT(5X,10AHFUR VALUES OF A THROUGH J AND L THROUGH Z LESS THAN
   L1, VALUE TABULATED IS INVERSE OF THE VALUE LESS THAN 1)
426 CONTINUE
   DD 304 M=1.25
   KK=0
   DO 484 K=1.273
   IF(SIN(M).EQ.0.) GO TO 485
   KK=1+KK
484 CONTINUE
485 CONTINUE
   WRITE(6,305)(SIN(M),M=1,KK)
305 FORMAT(2X,10F13.5)
   IF(KABC.NE.1) GO TO 727
   WRITE(6,*)728
728 FORMAT(2X,57MPARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE L
   LEVEL)
   DD 729 NL=1,KK
   AL=NL
   AK=KK
   PERCENT(KL)=((AK-AL)/100.)/AK
729 CONTINUE
   KT=0
   KZ=0
   DO 730 KR=1,KK
   KT=1+KT
   KZ=1+KZ
   CNT(KZ)=S(KT,M)
   KZ=1+KZ
   CNT(KZ)=PERCENT(KT)
730 CONTINUE
   WRITE(6,731)(CNT(KL),L=1,KZ)
731 FORMAT(2X,F9.2,F5.1,F9.2,F5.1,F9.2,F5.1,F9.2,F5.1,
   14X,F9.2,F5.1,4X,F9.2,F5.1,4X,F9.2,F5.1,4X,F9.2,F5.1)
727 CONTINUE
306 WRITE(6,306)
   FORMAT(2X,/)
306 CONTINUE
   KABC=1+KABC
   IF(KABC.NE.1) GO TO 422
   DO 423 M=7.81
   DD 423 M=1.92
   IF(VIN,M).GE.1.1 GO TO 482
   IF(VIN,M).EQ.0.1 GO TO 482
   AIN,M)=1./VIN,M)
   GO TO 421
482 AIN,M)=VIN,M)
421 CONTINUE
422 CONTINUE
   DD 480 M=1.25
   DD 481 M=1.273
   SIN,M)=0.
481 CONTINUE
482 CONTINUE
   GO TO 423
422 CONTINUE
   STOP

```

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/0
END
//60-SYSIN DB *
LL15TA TC328A=20..52..140..3.23..837..4,
TC328A=9..16..30..0..33..4,
TC335=20..80..305..1.85..15,
TC335=20..44..107..0..293..15,
TC336=30..70..160..0.65.0..15,
TC336=70..112..625..0..0..15,
TC248A=42..44..50..0..0..36,
TC248A=15..48..160..0..0..36,
TC3736=44..72..115..0..0..5,
TC3736=110..255..590..0..0..5,
TC930=30..74..180..0.058..209..3,
TC930=16..60..230..0..0.0109..3,
TC2481=10..10..10..0..2.3.4.09..36,
TC2481=18..30..53..0..124..36,
TC2907=20..53..135..0..0..4,
TC2907=53..78..110..0..0..4,
TC2222=32..85..220..0..0..5,
TC2222=40..135..400..0..0..5,
D4384=2100..2300..2800..0..16.9.1.3,
D5911=1600..2700..4100..0..27.7.0..,
0816=1400..2700..6400..0..1.93.0..,
0218E=1..1.2.0.3.4.0.0.0..,
0914A=15..80..427..0..233..423..068,
0752A=83..340..2300..0..536..4,
D9C115=510..1350..3300..0..686.0..0..,
030268=17000..0..0..0..0..59.5.1..,
03611=3000..3000..3000..0..15.9.2..,
C3995A=0..0..0..0..83..10..,
030168=13000..0..0..0..0..23.1.1..,
04141=8000..0..0..0..0..18.1.3..,
01082=670..0..0..0..0..17.7.95,
TC2857=12..4.16..120..0..0..2,
TC2857=84..2..8.8.2.0..0..2,
TC3375=570..1300..1800..0..0..11..,
TC3375=230..440..1300..0..0..11..,
TC1490=700..2300..7000..0..0..75..,
TC1490=1300..3800..13000..0..0..75..,
TC3584=120..377..1200..0..0..2.5..,
TC3584=490..2150..10000..0..0..2.5..,
TC2894=14..50..170..0..0..36,
TC2894=12..19..30..0..0..36,
TC5829=6..17..47..0..0..2,
TC5829=4.3.10..22..0..0..2,
TC3013=4.3.21..100..0..0..36,
TC3013=20..31.5.52..0..0..36,
TC3018=5..8.20..64..0054.0..3,
TC3018=4..10..22..00069.6..3,
TC5885=26..100..320..,
TC5885=20..50..130..,
TC1613=1600..2100..3200..301..888..8,
TC1613=160..340..750..0..103..8,
TC1485=700..1100..1700..0..0..1.7,
TC1485=3100..3000..290..0..0..1.7,
TC3439=10..27..78..0..0..1..,
TC3439=180..629..2200..0..0..1..,
TC706=2..8.17..93..0243.0..3,
TC706=6..8.18..50..0..0..3,

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APPENDIX A

018486-750..7500..7500..0..0..0..0..
 02580-1700..0..0..0..0..0..0..0..0..
 0751A-240..2500..25500..0..0..3..33..4..
 04858-100..435..2000..0..0..611..25..
 029912-10000..0..0..0..0..0..0..0..0..
 050258-1400..14000..14000..0..0..7..48..1..
 01054-25..335..44..
 0744A-2400..20000..15380..0..0..3..44..4..
 0445-580..580..1625..0..0..3..44..4..
 01212-1700..1900..9000..0..0..0..12..
 01731A-800..2000..5700..0..0..0..4..
 0604A-120..140..230..0..0..0..15..
 0404A-10..140..175..0..0..0..15..
 0297A-200..200..2700..0..0..5..6..35..
 0297A-14..200..3300..0..0..9..5..35..
 0526-130..425..188..39..225..
 01926-160..500..0..1..92..225..
 0270-19..20..23..0..0..1..38..08..
 0399A-115..170..230..0..0..07..0..2..
 0399A-130..205..350..0..0..0..0..2..
 0428M-170..260..420..0..0..087..0..15..
 0428M-220..280..335..0..0..0..0..15..
 0399-300..1100..3400..0..0..0139..0..035..
 0399-33..160..700..0..0..0..035..
 0501A-3..17..86..0..0..0113..0..060..
 0501A-4..9..18..79..0..0..0..060..
 0705-7..8..15..30..0303..0..15..
 0705-3..8..6..12..0..0..0..15..
 0666M-470..800..1400..0..269..0..15..
 0666M-640..790..930..0..0..0..15..
 01042-500..1500..4000..0..0..0..20..
 01042-360..1700..7500..0..0..0..20..
 0277-14..16..23..0..0..0459..08..
 031040..4..44..50..0..00719..06..
 DEVICE11-4M2N32,4M8A(C,4M-B),4M
 4M2N32,4M8A(C,4M-B),4M
 4M2N33,4M51(C,4M-B),4M
 4M2N33,4M51(E,4M-B),4M
 4M2N33,4M61(JA,4M1(C,4M-B),4M
 4M2N33,4M61(JA,4M1(E,4M-B),4M
 4M2N24,4M84(C,4M-B),4M
 4M2N24,4M84(E,4M-B),4M
 4M2N37,4M36(C,4M-B),4M
 4M2N37,4M36(E,4M-B),4M
 4M2N93,4M01(C,4M-B),4M
 4M2N93,4M01(E,4M-B),4M
 4M2N24,4M81(C,4M-B),4M
 4M2N24,4M81(E,4M-B),4M
 4M2N29,4M07A1,4M-C,4M-B,4M
 4M2N29,4M07A1,4M-E,4M-B,4M
 4M2N22,4M22A1,4M-C,4M-B,4M
 4M2N22,4M22A1,4M-E,4M-B,4M
 4M1M63,4M8C,4M
 4M1M63,4M8C,4M
 4M1M81,4M6
 4M1M21,4M8E,4M
 4M1M91,4M4A,4M
 4M1M75,4M2A,4M
 4MPC11,4M5,4M
 4M1N30,4M2661,4MJAN,4M

4M1N36, 4M11, 4M, 4M
 4M1N39, 4M92A, 4M, 4M
 4M1N30, 4M16B, 4M, 4M
 4M1N41, 4M41, 4M, 4M
 4M1D22, 4M, 4M, 4M
 4M2N28, 4M57C, 4M-B, 4M
 4M2N28, 4M57E, 4M-B, 4M
 4M2N33, 4M75C, 4M-B, 4M
 4M2N33, 4M75E, 4M-B, 4M
 4M2N14, 4M90J, 4M8N(C, 4M-B)
 4M2N14, 4M90J, 4M8N(E, 4M-B)
 4M2N35, 4M84C, 4M-B, 4M
 4M2N35, 4M84E, 4M-B, 4M
 4M2N28, 4M94C, 4M-B, 4M
 4M2N28, 4M94E, 4M-B, 4M
 4M2N58, 4M29C, 4M-B, 4M
 4M2N58, 4M29E, 4M-B, 4M
 4M2N30, 4M13J, 4M8N(C, 4M-B)
 4M2N30, 4M13J, 4M8N(E, 4M-B)
 4M4A30, 4M18C, 4M-B, 4M
 4M4A30, 4M18E, 4M-B, 4M
 4M5M85, 4M2651, 4M7C(-4MB)
 4M5M85, 4M2651, 4M7E(-4MB)
 4M2N16, 4M13J, 4M8N(C, 4M-B)
 4M2N16, 4M13J, 4M8N(E, 4M-B)
 4M2N14, 4M85J, 4M8N(C, 4M-B)
 4M2N14, 4M85J, 4M8N(E, 4M-B)
 4M2N34, 4M39C, 4M-B, 4M
 4M2N34, 4M39E, 4M-B, 4M
 4M2N70, 4M6J, 4M8N(C, 4MB)
 4M2N70, 4M6J, 4M8N(E, 4MB)
 4M1B-6, 4M9-67, 4M35, 4M
 4M1N25, 4M8J, 4M, 4M
 4M1N75, 4M1A2J, 4M8N, 4M
 4M1N48, 4M58J, 4M8N, 4M
 4M1N29, 4M91D, 4M8N, 4M
 4M1N30, 4M25B, 4M8N, 4M
 4M1N10, 4M54, 4M, 4M
 4M1N74, 4M6A2J, 4M8N, 4M
 4M1N64, 4M5J, 4M8N, 4M
 4M1N12, 4M02RA, 4M8JAN, 4M
 4M1N17, 4M31A, 4M8JAN, 4M
 4M2N40, 4M4A1C, 4M-B, 4M
 4M2N40, 4M4A1E, 4M-B, 4M
 4M2N29, 4M7A1C, 4M-B, 4M
 4M2N29, 4M7A1E, 4M-B, 4M
 4M2N52, 4M6C(-4MB), 4M
 4M2N52, 4M6E(-4MB), 4M
 4M1N27, 4M8, 4M, 4M
 4M2N39, 4M6A1C, 4M-B, 4M
 4M2N39, 4M6A1E, 4M-B, 4M
 4M2N42, 4M8N(C, 4M-B)
 4M2N42, 4M8N(E, 4M-B)
 4M2N39, 4M38JA, 4M8N(C, 4MB)
 4M2N39, 4M38JA, 4M8N(E, 4MB)
 4M2N50, 4M1A2J, 4M8N(C, 4M-B)
 4M2N50, 4M1A2J, 4M8N(E, 4M-B)
 4M2N70, 4M5J, 4M8N(C, 4MB)
 4M2N70, 4M5J, 4M8N(E, 4MB)
 4M2N46, 4M6M1J, 4M8N(C, 4M-B)

APPENDIX A

[illegible]

RATIO OF EXPERIMENTAL POWER TO DAMAGE TO DC POWER MODEL PREDICTED VALUE FOR FOLLOWING MODEL DATA BASES

A--ALL DEVICES
 B--ALL SILICON DEVICES
 C--ALL GERMANIUM DEVICES
 D--ALL DEVICES WITHOUT CAPACITANCE MODEL DATA
 E--ALL SILICON DEVICES WITHOUT CAPACITANCE MODEL DATA
 F--ALL GERMANIUM DEVICES WITHOUT CAPACITANCE MODEL DATA
 G--ALL SILICON DEVICES NOT INCLUDED WITHIN 145 REPORT
 H--ALL GERMANIUM DEVICES NOT INCLUDED WITHIN 145 REPORT
 I--ALL SILICON DEVICES INCLUDED WITHIN 145 REPORT
 J--ALL GERMANIUM DEVICES INCLUDED WITHIN 145 REPORT

FOR ALL CASES WHERE DATA BASE PERMITS. RATIOS ARE ONLY FOR THE REMAINING SILICON OR GE DEVICES NOT INCLUDED IN DATA BASE

FOR ITEM N. -1 INDICATES NO CALCULATION

A 0.0 ENTRY INDICATES NO DATA OR NO CALCULATION

NEGATIVE SIGN INDICATES ESTIMATED VALUES FOR POWER TO DAMAGE

JUNCTION REVERSE BIAS CONDITIONS ONLY

ARITHMETIC MEAN USED FOR ALL MODEL DATA BASES

ALL PREDICTED VALUES FOR EXP. POWER TO DAMAGE INCLUDED IN DATA BASE CALCULATIONS

APPENDIX A

	EXP. POWER TO DAMAGE AT IUS (WATTS)	EXP. POWER TO DAMAGE AT IUS (WATTS)	EXP. POWER TO DAMAGE AT O-JUS (WATTS)	DAM. CONST. DATA BOOK PARAMETERS (M-SEC-0.5)	DAM. CONST. EXPERIMENTAL PARAMETERS (M-SEC-0.5)	DC POWER RATING (WATTS)	POWER CLASS HIGH-2 LOW-1 EXCLUDED-0
SILICON DEVICES							
2N328A(C-B)	20.000	52.000	140.000	3.2300	0.8370	0.4000	1-
2N328A(L-B)	9.70	16.000	30.000	0.0	0.3300	0.4000	1-
2N335(C-P)	20.000	80.000	300.000	0.3050	1.0500	0.1500	1-
2N335(E-B)	20.000	44.000	100.000	0.0	0.2030	0.1500	1-
2N336(JAN(C-B)	30.000	70.000	160.000	0.6500	0.0	0.1500	1-
2N336(JAN(E-B)	75.000	112.000	625.000	0.0	0.0	0.1500	1-
2N248A(C-B)	42.000	46.000	50.000	0.0	0.0	0.3600	1-
2N248A(E-B)	15.000	48.000	160.000	0.0	0.0	0.3600	1-
2N3736(C-B)	44.000	72.000	115.000	0.0	0.0	0.5000	1-
2N3736(E-B)	110.000	255.000	590.000	0.0	0.0	0.5000	1-
2N3736(L-B)	30.000	74.000	180.000	0.0500	0.2090	0.3000	1-
2N3737(E-B)	16.000	60.000	230.000	0.0	0.0108	0.3000	1-
2N2481(C-B)	19.000	10.000	10.000	0.2130	4.3930	0.3600	1-
2N2481(E-B)	18.000	30.000	53.000	0.0	0.1240	0.3600	1-
2N2907A(C-B)	20.000	53.000	135.000	0.0	0.0	0.4000	1-
2N2907A(E-B)	53.000	78.000	110.000	0.0	0.0	0.4000	1-
2N222A(C-B)	32.000	85.000	220.000	0.0	0.0	0.5000	1-
2N222A(E-B)	40.000	135.000	400.000	0.0	0.0	0.5000	1-
1N4384	2100.000	2300.000	2800.000	1.0	16.9000	1.3000	2-
FS911-3465	1400.000	2700.000	4100.000	0.0	27.7000	0.0	0-
1N4816	1400.000	2700.000	6400.000	0.0	1.9200	0.0	2-
1N21ME	1.100	2.000	3.400	0.0	0.0	0.0	0-
1N914A	15.000	80.000	420.000	0.2330	0.4230	0.0680	1-
1N752A	83.000	340.000	2300.000	0.0	0.5360	0.4000	1-
PC115	510.000	1350.000	3300.000	0.6860	0.0	0.0	2-
1N30268(JAN	17000.000	-53719.996	-170000.000	0.0	59.5000	1.0000	2-
1N3611	3000.000	3000.000	3000.000	0.0	15.9000	2.2000	2-
1N3995A	-26244.594	-83000.000	-262446.000	0.0	83.0000	10.0000	0-
1N3014B	13000.000	-41079.996	-130000.000	0.0	23.1000	1.0000	2-
1N4141	8000.000	-25279.996	-80000.000	0.0	18.1000	3.0000	2-
1002	670.000	-2117.200	-6700.000	1.0	17.7000	0.9500	1-
2N2857(C-B)	12.400	16.000	120.000	0.0	0.0	0.2000	1-
2N2857(E-B)	0.840	2.400	8.200	0.0	0.0	0.2000	1-
2N3375(C-B)	500.000	1000.000	1800.000	0.0	0.0	11.0000	2-
2N3375(E-B)	230.000	440.000	1300.000	0.0	0.0	11.0000	2-
2N1490(JAN(C-B)	700.000	2300.000	7000.000	0.0	0.0	75.0000	2-
2N1490(JAN(E-B)	1300.000	3800.000	13000.000	0.0	0.0	75.0000	2-
2N3584(C-B)	120.000	370.000	1200.000	0.0	0.0	2.5000	2-
2N3584(E-B)	490.000	2150.000	19000.000	1.0	1.0	2.5000	2-
2N2894(C-B)	14.000	50.000	170.000	0.0	0.0	0.3600	1-
2N2894(E-B)	12.000	19.000	30.000	0.0	0.0	0.3600	1-
2N5829(C-B)	6.000	17.000	47.000	0.0	0.0	0.2000	1-
2N5829(E-B)	4.300	10.000	22.000	1.0	1.0	0.2000	1-
2N3013(JAN(C-B)	4.300	21.000	100.000	0.0	0.0	0.3600	1-
2N3013(JAN(E-B)	20.000	31.500	52.000	0.0	0.0	0.3600	1-
CA3018(C-B)	5.600	20.000	64.000	0.0056	0.0	0.3000	1-
CA3018(E-B)	4.000	10.000	22.000	0.0056	0.0	0.3000	1-
5N826517(C-B)	26.000	100.000	320.000	0.0	0.0	0.0	0-
5N826517(E-B)	20.000	50.000	130.000	0.0	0.0	0.0	0-
2N1613(JAN(C-B)	1400.000	2100.000	3200.000	0.3010	0.8880	0.8000	1-
2N1613(JAN(E-B)	160.000	340.000	750.000	0.0	0.1330	0.8000	1-
2N1485(JAN(C-B)	700.000	1100.000	1700.000	0.0	0.0	1.7000	2-
2N1485(JAN(E-B)	3100.000	-37000.000	-297000.000	0.0	0.0	1.7000	2-

2N3439(C-B)	10.000	27.000	78.000	1.0	1.0000	2-
2N3439(E-B)	180.000	620.000	2200.000	0.0	1.0000	2-
2N7063JAN(C-B)	2.800	17.000	93.000	0.0	0.3000	1-
2N7063JAN(E-B)	6.800	18.000	50.000	0.0	0.3000	1-
1R-69-6735	750.000	7500.000	75000.000	0.0	0.0	0-
1N2500	17000.000	-53718.996	-170000.000	0.0	13.0000	2-
1N751A:JAN	240.000	2500.000	25500.000	0.0	0.4000	1-
1N4585:JAN	100.000	435.000	2000.000	0.0	0.2500	1-
1N29918:JAN	10000.000	-31599.996	-100000.000	0.0	10.0000	2-
1N30258:JAN	1400.000	-14000.000	-140000.000	0.0	1.0000	2-
M01054	25.000	33.500	44.000	0.0	0.0	0-
1N746A:JAN	2600.000	-20000.000	-153800.000	0.0	0.4000	1-
1N455:JAN	500.000	580.000	1625.000	0.0	0.4000	1-
1N1202A:JAN	100.000	1000.000	9000.000	0.0	12.0000	2-
1N1731A:JAN	800.000	2000.000	5700.000	0.0	4.0000	2-
GERMANIUM DEVICES						
2N404A(C-B)	120.000	160.000	230.000	0.0920	0.1500	1-
2N404A(E-B)	104.000	140.000	175.000	0.0	0.1500	1-
2N297A(C-B)	2000.000	2200.000	2700.000	0.0	35.0000	2-
2N297A(E-B)	1400.000	2100.000	3300.000	0.0	35.0000	2-
2N526(C-B)	130.000	225.000	425.000	0.1880	0.2250	1-
2N526(E-B)	160.000	290.000	500.000	0.0	0.2250	1-
1N270	19.000	20.000	23.000	0.0	0.0800	1-
2N398A(C-B)	115.000	170.000	230.000	0.0870	0.2000	1-
2N398A(E-B)	130.000	205.000	350.000	0.0	0.2000	1-
2N428M:JAN(C-B)	170.000	260.000	420.000	0.0870	0.1500	1-
2N428M:JAN(E-B)	220.000	280.000	335.000	0.0	0.1500	1-
2N393:JAN(C-B)	300.000	1100.000	3400.000	0.0134	0.0350	1-
2N393:JAN(E-B)	33.000	160.000	700.000	0.0	0.0350	1-
2N501A:JAN(C-B)	3.000	17.000	86.000	0.0112	0.0600	1-
2N501A:JAN(E-B)	4.900	18.000	79.000	0.0	0.0600	1-
2N705:JAN(C-B)	7.800	15.000	30.000	0.0303	0.1500	1-
2N705:JAN(E-B)	3.600	6.600	12.000	0.0	0.1500	1-
2N466M:JAN(C-B)	470.000	800.000	1405.000	0.2690	0.1500	1-
2N466M:JAN(E-B)	640.000	790.000	930.000	0.0	0.1500	1-
2N1042A:JAN(C-B)	500.000	1500.000	4000.000	0.0	20.0000	2-
2N1042A:JAN(E-B)	360.000	1700.000	7500.000	0.0	20.0000	2-
1N277:JAN	14.000	18.000	23.000	0.0	0.0800	1-
MS1040	0.400	0.440	0.500	0.0	0.0600	0-

RATIO OF EXPERIMENTAL POWER TO DAMAGE TO DEVICE DC POWER RATING

	10 USEC	1 USEC	0.1 USEC
2N320A(C-B)	50.0	130.0	350.0
2N320A(E-B)	22.5	40.0	75.0
2N335(C-B)	133.3	533.3	2700.0
2N335(E-B)	133.3	293.3	666.7
2N336:JAN(C-B)	200.0	466.7	1066.7
2N336:JAN(E-B)	466.7	746.7	4166.7
2N248A(C-B)	116.7	127.8	138.9
2N248A(E-B)	41.7	133.3	444.4

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2N37361(-B)	88.0	144.0	220.0
2N37361E(-B)	220.0	510.0	1180.0
2N9301(-B)	100.0	246.7	600.0
2N9301E(-B)	53.3	200.0	766.7
2N24011(-B)	27.8	27.8	27.8
2N24011E(-B)	50.0	83.3	147.2
2N2907A1C(-B)	50.0	132.5	337.5
2N2907A1E(-B)	132.5	195.0	275.0
2N2222A1C(-B)	64.0	170.0	440.0
2N2222A1E(-B)	60.0	270.0	800.0
1N4384	1615.4	1769.2	2153.8
FS911-3465	0.0	0.0	0.0
1N616	0.0	0.0	0.0
1N21ME	0.0	0.0	0.0
1N914A	220.6	1176.5	6176.5
1N752A	207.5	850.0	5750.0
PC115	0.0	0.0	0.0
1N30268:JAN	1700.0	-53720.0	-170000.0
1N3611	1363.6	1363.6	1363.6
1N3995A	-2626.5	-8300.0	-26244.6
1N30168	13000.0	-41080.0	-130107.0
1N4141	2666.7	-8426.7	-26666.7
1002	705.3	-2228.6	-7052.6
2N28571(-B)	62.0	80.0	600.0
2N28571E(-B)	4.2	13.0	41.0
2N33751(-B)	45.5	90.9	163.6
2N33751E(-B)	20.9	40.0	118.2
2N14902:JAN(-B)	9.3	30.7	93.3
2N14902:JAN(E-B)	17.3	50.7	173.3
2N3534(-B)	48.0	148.0	480.0
2N3584(-B)	196.0	860.0	4900.0
2N2894(-B)	38.9	138.9	472.2
2N2894E(-B)	33.3	52.8	83.3
2N5829(-B)	30.0	85.0	235.0
2N5829E(-B)	21.5	50.0	110.0
2N30138:JAN(-B)	11.9	58.3	277.8
2N30138:JAN(E-B)	55.6	87.5	144.4
CA3018(-B)	19.3	66.7	213.3
CA3018E(-B)	13.3	33.3	73.3
SM826517(-B)	0.0	0.0	0.0
SM826517E(-B)	0.0	0.0	0.0
2N1613:JAN(-B)	1750.0	2625.0	4000.0
2N1613:JAN(E-B)	200.0	425.0	937.5
2N1485:JAN(-B)	411.8	647.1	1000.0
2N1485:JAN(E-B)	1823.5	-17647.1	-170588.2
2N3439(-B)	10.0	27.0	78.0
2N3439E(-B)	180.0	620.0	2200.0
2N7068:JAN(-B)	9.3	56.7	310.0
2N7068:JAN(E-B)	22.7	60.0	146.7
1R-69-6735	0.0	0.0	0.0
1N258U	1307.7	-4132.3	-13076.9
1N751A:JAN	600.0	6250.0	63750.0
1N485B:JAN	400.0	1740.0	8000.0
1N29918:JAN	1000.0	-3160.0	-10000.0
1N30258:JAN	1400.0	-14000.0	-140000.0
WJ1054	0.0	0.0	0.0
1N746A:JAN	6500.0	-50000.0	-384500.0
1N645:JAN	1250.0	1450.0	4062.5
1N1202A:JAN	8.3	83.3	750.0
1N1731A:JAN	200.0	500.0	1425.0

APPENDIX A

	A	A	A	B	B	C	C	C	D
	10 USEC	1 USEC	0.1 USEC	10 USEC	1 USEC	0.1 USEC	10 USEC	1 USEC	0.1 USEC
2M404AIC(-B)	890.0	1066.7	1533.3						
2M404AIE(-B)	693.3	933.3	1166.7						
2M297AIC(-B)	57.1	62.9	77.1						
2M297AIE(-B)	40.0	60.0	94.3						
2M526AIC(-B)	577.8	1090.0	1888.9						
2M526AIE(-B)	711.1	1288.9	2222.2						
1M270	237.5	250.0	287.5						
2M396AIC(-B)	575.0	850.0	1150.0						
2M396AIE(-B)	650.0	1025.0	1750.0						
2M428AIC(-B)	1133.3	1733.3	2800.0						
2M428AIE(-B)	1466.7	1866.7	2233.3						
2M393AIC(-B)	8571.4	31428.6	97142.8						
2M393AIE(-B)	942.9	4571.4	20000.0						
2M501AIC(-B)	50.0	283.3	1433.3						
2M501AIE(-B)	81.7	300.0	1316.7						
2M705AIC(-B)	52.0	100.0	200.0						
2M705AIE(-B)	24.0	44.0	80.0						
2M668AIC(-B)	3133.3	5333.3	9333.3						
2M668AIE(-B)	4266.7	5266.7	6200.0						
2M104AIC(-B)	25.0	75.0	200.0						
2M104AIE(-B)	18.0	85.0	375.0						
1M277AIC(-B)	175.0	225.0	287.5						
1M277AIE(-B)	6.7	7.3	8.3						
M51040									
2M328AIC(-B)	0.04975	0.03766	0.02147	0.05073	0.03411	0.01748	0.0	0.0	0.14670
2M328AIE(-B)	0.02239	0.01159	0.00460	0.02283	0.01050	0.00375	0.0	0.0	0.06001
2M335AIC(-B)	0.13266	0.15449	0.12269	0.13529	0.13994	0.09990	0.0	0.0	0.39119
2M335AIE(-B)	0.13266	0.08497	0.04090	0.13529	0.07697	0.03330	0.0	0.0	0.39119
2M336AIC(-B)	0.19899	0.13518	0.06543	0.20293	0.12245	0.05328	0.0	0.0	0.58679
2M336AIE(-B)	0.46431	0.21629	0.25560	0.47350	0.19591	0.20812	0.0	0.0	0.0
2M248AIC(-B)	0.11608	0.03701	0.00852	0.11838	0.03353	0.00694	0.0	0.0	0.0
2M248AIE(-B)	0.04146	0.03862	0.02726	0.04228	0.03498	0.02220	0.0	0.0	0.0
2M373AIC(-B)	0.08755	0.04171	0.01411	0.08929	0.03778	0.01149	0.0	0.0	0.0
2M373AIE(-B)	0.21889	0.14773	0.07239	0.22322	0.13382	0.05894	0.0	0.0	0.0
2M930AIC(-B)	0.09949	0.07145	0.03681	0.10147	0.06472	0.02997	0.0	0.0	0.29339
2M930AIE(-B)	0.05306	0.05793	0.04703	0.05411	0.05248	0.03829	0.0	0.0	0.15644
2M248AIC(-B)	0.02764	0.00805	0.00170	0.02818	0.00729	0.00139	0.0	0.0	0.08150
2M248AIE(-B)	0.04975	0.02414	0.00903	0.05073	0.02187	0.00735	0.0	0.0	0.14670
2M290AIC(-B)	0.04975	0.03838	0.02070	0.05073	0.03477	0.01686	0.0	0.0	0.0
2M290AIE(-B)	0.13183	0.05649	0.01687	0.13444	0.05116	0.01374	0.0	0.0	0.0
2M222AIC(-B)	0.06368	0.04924	0.02699	0.06494	0.04461	0.02198	0.0	0.0	0.0
2M222AIE(-B)	0.07960	0.07821	0.04908	0.08117	0.07084	0.03994	0.0	0.0	0.0
1M4384	1.60721	0.51250	0.13213	1.63905	0.46422	0.10758	0.0	0.0	4.73942
F5911-3465	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1M616	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1M219E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1M914A	0.21947	0.34079	0.57889	0.22382	0.31869	0.50850	0.0	0.0	0.64719
1M752A	0.20645	0.24622	0.35273	0.21054	0.22303	0.28720	0.0	0.0	0.60879
PC115	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1M3028B:JAN	16.91402	15.56127	10.42856	17.24905	14.09522	8.49121	0.0	0.0	49.81672
1M3611	1.35674	0.39501	0.08365	1.38361	0.35780	0.06811	0.0	0.0	4.00081

APPENDIX A

	D	D	E	E	F	F	F	G	G	G
	1 USEC	0.1 USEC	10 USEC	1 USEC	0.1 USEC	10 USEC	1 USEC	0.1 USEC	10 USEC	1 USEC
2N1042RAJAN(C-B)	0.02487	0.02173	0.01227	0.0	0.0	0.0	0.02367	0.02982	0.03031	0.0
2N1042RAJAN(E-B)	0.01791	0.02462	0.02300	0.0	0.0	0.0	0.01705	0.03379	0.05683	0.0
1N2777JAN	0.17412	0.08518	0.01784	0.0	0.0	0.0	0.16572	0.08945	0.04357	0.51344
MS1040	0.00663	0.00212	0.00051	0.0	0.0	0.0	0.00631	0.00292	0.00126	0.01956
2N328A1(C-B)	0.12316	0.05773	0.02642	0.14428	0.05311	0.0	0.0	0.0	0.0	0.0
2N328A1(E-B)	0.03790	0.01237	0.01199	0.04439	0.01138	0.0	0.0	0.0	0.0	0.0
2N3351(C-B)	0.50528	0.32989	0.71045	0.59192	0.30349	0.0	0.0	0.0	0.0	0.0
2N3351(E-B)	0.27790	0.10996	0.71045	0.32556	0.10116	0.0	0.0	0.0	0.0	0.0
2N3361JAN(C-B)	0.44212	0.17594	1.06567	0.51793	0.16166	0.0	0.0	0.0	0.0	0.0
2N3361JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2484(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2484(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3736(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3736(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N9301(C-B)	0.23369	0.09897	0.53284	0.27376	0.09105	0.0	0.0	0.0	0.0	0.0
2N9301(E-B)	0.18948	0.12646	0.28418	0.22197	0.11634	0.0	0.0	0.0	0.0	0.0
2N2481(C-B)	0.02632	0.00458	0.14801	0.03083	0.00422	0.0	0.0	0.0	0.0	0.0
2N2481(E-B)	0.07895	0.02423	0.26642	0.09249	0.02234	0.0	0.0	0.0	0.0	0.0
2N2907(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2907(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N222A(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N222A(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N4384	1.67616	0.35526	8.61734	1.96358	0.32684	0.0	0.0	0.0	0.0	0.0
FS911-3465	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N816	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N21ME	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N914A	1.11458	1.01877	1.17537	1.31570	0.93725	0.0	0.0	0.0	0.0	0.0
1N752A	0.80529	0.94843	1.10563	0.94337	0.87254	0.0	0.0	0.0	0.0	0.0
PC115	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N3026B:JAN	50.89406	28.04644	90.58205	59.82102	25.79674	0.0	0.0	0.0	0.0	0.0
1N3611	1.2919	0.22492	7.26594	1.51343	0.20553	0.0	0.0	0.0	0.0	0.0
1N395A	7.86338	4.32884	13.98406	9.21174	3.98250	0.0	0.0	0.0	0.0	0.0
1N30168	38.91898	21.44269	69.26862	45.59254	19.72691	0.0	0.0	0.0	0.0	0.0
1N4141	7.98338	4.39850	14.20895	9.35232	4.04655	0.0	0.0	0.0	0.0	0.0
1002	2.11139	1.16329	3.75769	2.47344	1.17020	0.0	0.0	0.0	0.0	0.0
2N2857(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.04040	0.01751
2N2857(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00274	0.00285
2N3375(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02962	0.01990
2N3375(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01363	0.00875
2N1490:JAN(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00608	0.00671
2N1490:JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01130	0.01109
2N3584(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.03128	0.03239
2N3584(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.12772	0.18622
2N2894(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02534	0.03640
2N2894(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02172	0.01155
2N5829(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01955	0.01860
2N5829(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01401	0.01094
2N3013:JAN(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00778	0.01277
2N3013:JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.03620	0.01915
CA3018(C-B)	0.06316	0.03519	0.10301	0.07399	0.03237	0.0	0.0	0.0	0.01260	0.01459

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	0.03158	0.01216	0.037104	0.03699	0.01113	0.0	0.0	0.0	0.00869	0.00730
(A3018(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SM0265171C(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SM0265171E(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N1613(JANIC(-B)	2.48691	0.65978	7.32462	2.91335	0.6098	0.0	0.0	0.0	1.14039	0.57452
2N1613(JANIE(-B)	0.0	0.0	1.06567	0.47169	0.16226	0.0	0.0	0.0	0.13033	0.09302
2N1485(JANIC(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.26833	0.14162
2N1485(JANIE(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.18830	3.86229
2N34391C(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00652	0.00591
2N34391C(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.11730	0.13570
2N7065(JANIC(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00608	0.01240
2N7065(JANIE(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01477	0.01313
1B-69-6735	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1A2580	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N7515(JAN	5.92122	10.51517	3.19701	6.93655	9.67378	0.0	0.0	0.0	0.87216	0.90441
1N7515(JAN	1.64847	1.31955	2.13134	1.93114	1.21396	0.0	0.0	0.0	0.19099	1.36789
1N29918(JAN	2.99377	1.64944	5.32836	3.50712	1.51746	0.0	0.0	0.0	0.06064	0.38082
1N30258(JAN	13.26353	23.09212	7.45970	15.53787	21.24437	0.0	0.0	0.0	0.85165	0.69161
W01054	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.91231	3.06408
1N746A(JAN	47.36977	53.42088	34.63632	55.49240	58.34615	0.0	0.0	0.0	0.0	0.0
1N645(JAN	1.37372	0.67008	6.66045	1.60928	0.61647	0.0	0.0	0.0	4.23573	10.94316
1N1202RA(JAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.81456	0.31735
1N1731A(JAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.06543	0.01824
2N404A1C(-B)	1.01055	0.25291	0.0	0.0	0.0	0.0	0.0	0.0	0.13053	0.10943
2N404A1E(-B)	0.88426	0.19243	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N297A1C(-B)	0.05955	0.01272	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N297A1E(-B)	1.05664	0.01555	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N5261C(-B)	0.94739	0.31156	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N5261E(-B)	1.22109	0.36654	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N230	0.22385	0.04742	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N396A1C(-B)	0.80529	0.18969	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N396A1E(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N4288(JANIC(-B)	1.64235	0.46184	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N4288(JANIE(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3935(JANIC(-B)	29.77527	16.02310	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3935(JANIE(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N501A(JANIC(-B)	0.26843	0.73642	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N501A(JANIE(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N705(JANIC(-B)	0.09474	0.03299	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N705(JANIE(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N4688(JANIC(-B)	5.05277	1.53948	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N4688(JANIE(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N1442RA(JANIC(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N1442RA(JANIE(-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N2775(JAN	0.21316	0.04742	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MS1C40	0.00695	0.00137	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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[illegible]

[illegible]

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ANALYSIS OF VARIANCE FOR RELATIONSHIP: $K = 0.7000 (-N)$ DERIVED FROM EXPERIMENTAL DAMAGE DATA FOR TIME INTERVALS INDICATED

	10-1 USEC	1-1 USEC	10-1 USEC	10-1 USEC
2N320A1(-B)	0.41497	0.43012	0.42255	0.426144
2N320A1E(-B)	0.26980	0.27300	0.26980	0.26980
2N3351C(-B)	0.42204	0.37403	0.36949	0.36949
2N3351E(-B)	0.36242	0.35855	0.36350	0.36350
2N3362A1N1C(-B)	0.36798	0.35952	0.36798	0.36798
2N3362A1N1E(-B)	0.20412	0.24666	0.20412	0.20412
2N248A1C(-B)	0.39511	0.33621	0.33786	0.33786
2N248A1E(-B)	0.50515	0.52288	0.51401	0.51401
2N37361C(-B)	0.21388	0.20337	0.20862	0.20862
2N37361E(-B)	0.36515	0.36431	0.36473	0.36473
2N3931C(-B)	0.39211	0.38614	0.38908	0.38908
2N39301E(-B)	0.57403	0.58358	0.57880	0.57880
2N2401C(-B)	0.22185	0.24715	0.23450	0.23450
2N2401E(-B)	0.42325	0.40616	0.41465	0.41465
2N2907A1C(-B)	0.16782	0.14930	0.15856	0.15856
2N2907A1E(-B)	0.42427	0.41310	0.41864	0.41864
2N222A1C(-B)	0.52827	0.47173	0.50000	0.50000
2N222A1E(-B)	0.03951	0.05453	0.06247	0.06247
1N4384	0.22724	0.18142	0.20433	0.20433
5F911-3465	0.28524	0.37482	0.33003	0.33003
1N816				

1N21ME	0.25964	0.23045	0.24504
1N914A	0.72700	0.72016	0.72352
1N752A	0.61240	0.63025	0.72132
PC115	0.42276	0.38818	0.43547
1N30268:JAN	-1.00000	-1.00000	-1.00000
1N3611	C.O	C.O	C.O
1N3995A	-1.00000	-1.00000	-1.00000
1N30168	-1.00000	-1.00000	-1.00000
1N6141	-1.00000	-1.00000	-1.00000
1002	-1.00000	-1.00000	-1.00000
2N28571(-B)	0.11070	0.87506	0.49288
2N28571E(-B)	0.49069	0.49884	0.49477
2N33751(-B)	0.30103	0.25527	0.27815
2N33751E(-B)	0.28172	0.47049	0.37411
2N1490:JAN(C-B)	0.51663	0.48337	0.50000
2N1490:JAN(E-B)	0.46584	0.53416	0.50000
2N35841(-B)	0.48902	0.51098	0.50000
2N35841E(-B)	0.44224	0.66756	0.65490
2N28941(-B)	0.55284	0.53148	0.54216
2N28941E(-B)	0.19957	0.19837	0.19497
2N58291(-B)	0.45230	0.44165	0.44697
2N58291E(-B)	0.36653	0.34242	0.35448
2N3013:JAN(C-B)	0.46875	0.67778	0.68327
2N3013:JAN(E-B)	0.19728	0.21769	0.20749
CA30181(-B)	0.53740	0.50515	0.52138
CA30181E(-B)	0.39794	0.34242	0.37118
SB5265171(-B)	0.58503	0.50515	0.54509
SB5265171E(-B)	0.39794	0.41497	0.40646
2N1613:JAN(C-B)	0.17609	0.18293	0.17951
2N1613:JAN(E-B)	0.32736	0.34358	0.33547
2N1485:JAN(C-B)	0.19629	0.18906	0.19268
2N1485:JAN(E-B)	-1.00000	-1.00000	-1.00000
2N34391(-B)	0.43136	0.46073	0.44605
2N34391E(-B)	0.53712	0.55003	0.54357
2N706:JAN(C-B)	0.78329	0.73803	0.76066
2N706:JAN(E-B)	0.42276	0.44370	0.43323
IR-49-6735	1.00000	1.00000	1.00000
1N2580	-1.00000	-1.00000	-1.00000
1N751A:JAN	1.01773	1.00860	1.01316
1N685B:JAN	0.63849	0.66254	0.65051
1N2991B:JAN	-1.00000	-1.00000	-1.00000
1N3025B:JAN	-1.00000	-1.00000	-1.00000
MO1054	0.12710	0.11841	0.12276
1N746A:JAN	-1.00000	-1.00000	-1.00000
1N645:JAN	0.06446	0.44743	0.25594
1N1202A:JAN	1.00000	0.95424	0.97712
1N1731A:JAN	0.39794	0.45484	0.42839
2N404A(C-B)	0.12494	0.15761	0.14127
2N404A1E(-B)	0.12909	0.09691	0.11390
2N297A1C(-B)	0.04139	0.08894	0.06517
2N297A1E(-B)	0.17609	0.19629	0.18619
2N5261C(-B)	0.23824	0.27621	0.25722
2N5261E(-B)	0.25828	0.23657	0.24742
1N270	0.02228	0.06070	0.04149
2N396A1C(-B)	0.16975	0.13128	0.15052
2N396A1E(-B)	0.19781	0.23231	0.21506
2N428ME:JAN(C-B)	0.18452	0.20828	0.19640
2N428ME:JAN(E-B)	0.10474	0.07789	0.09131
2N393:JAN(C-B)	0.56427	0.49009	0.52718
2N393:JAN(E-B)	0.48561	0.64098	0.68329

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2N501A2JAN(C-B)	0.75333	0.70405	0.72869
2N501A2JAN(E-B)	0.56508	0.64235	0.60372
2N7052JAN(C-B)	0.28400	0.30103	0.29251
2N7052JAN(E-B)	0.26324	0.25964	0.26144
2N666M2JAN(C-B)	0.23099	0.24304	0.23702
2N666M2JAN(E-B)	0.09145	0.07086	0.08115
2N1042RAJAN(C-B)	0.47712	0.42597	0.45154
2N1042RAJAN(E-B)	0.67415	0.64461	0.65938
1N2772JAN	0.10914	0.10644	0.10780
MS1040	0.04139	0.05552	0.04645

ARITHMETIC MEAN VALUES FOR QUANTITIES A THROUGH J FOR PULSE DURATIONS OF 10, 1, AND 0.1 USEC

0.10E+14	0.35E+14	0.16E+15
0.99E+03	0.38E+04	0.20E+05
0.11E+04	0.25E+04	0.66E+04
0.34E+03	0.11E+04	0.61E+04
0.19E+13	0.90E+03	0.66E+14
0.93E+03	0.17E+04	0.40E+04
0.15E+04	0.46E+04	0.14E+05
0.45E+03	0.67E+03	0.10E+04
0.34E+13	0.32E+04	0.25E+05
0.13E+04	0.33E+04	0.90E+04

POWER TO DAMAGE EQUATION COEFFICIENTS FOR POPULATIONS DEFINED BY A THROUGH J

$$P = K1 T^{-1} + K2 T^{-1/2} + K3$$

	K1	K2	K3
0.821E-03	0.249E+01	0.136E+03	
0.110E-02	0.258E+01	0.527E+02	
-0.863E-14	0.225E+01	0.354E+03	
0.446E-03	0.458E+00	0.152E+03	
0.558E-03	0.309E+00	0.342E+02	
0.145E-04	0.103E+01	0.606E+03	
0.403E-04	0.438E+01	0.144E+03	
-0.528E-04	0.392E+00	0.327E+03	
0.212E-12	0.110E+01	-0.222E+02	
-0.101E-03	0.306E+01	0.366E+03	

RATIO OF EXPERIMENTAL POWER TO DAMAGE TO PREDICTED VALUE BASED ON JUNCTION CAPACITANCE MODELS L-MODEL BASED ON D-A-T-A. BOOK
PARAMETERS M-MODEL BASED ON EXPERIMENTAL PARAMETERS N-MODEL BASED ON EXPERIMENTAL PARAMETERS AND, WHERE DATA MISSING,
BASED ON D-A-T-A. BOOK PARAMETERS

	10 USEC	1 USEC	0.1 USEC	10 USEC	1 USEC	0.1 USEC	10 USEC	1 USEC	0.1 USEC	10 USEC	1 USEC	0.1 USEC
2N328A(C-B)	0.01958	0.01610	0.01371	0.07557	0.06214	0.05291	0.07557	0.06214	0.05291	0.07557	0.06214	0.05291
2N328A(E-B)	0.0	0.0	0.0	0.08625	0.04849	0.02876	0.08625	0.04849	0.02876	0.08625	0.04849	0.02876
2N335(C-B)	0.20738	0.26234	0.31113	0.03419	0.04325	0.05129	0.03419	0.04325	0.05129	0.03419	0.04325	0.05129
2N335(E-B)	0.0	0.0	0.0	0.21587	0.15020	0.10796	0.21587	0.15020	0.10796	0.21587	0.15020	0.10796
2N336JAN(C-B)	0.14596	0.10771	0.07786	0.0	0.0	0.0	0.14596	0.10771	0.07786	0.14596	0.10771	0.07786
2N336JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N484A(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N484A(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3736(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3736(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N330(C-B)	1.63581	1.27619	0.98166	0.45396	0.35413	0.27242	0.45396	0.35413	0.27242	0.45396	0.35413	0.27242
2N330(E-B)	0.0	0.0	0.0	4.68527	5.5653	6.73626	4.68527	5.5653	6.73626	4.68527	5.5653	6.73626
2N481(C-B)	0.15579	0.04927	0.03558	0.00773	0.00245	0.00077	0.00773	0.00245	0.00077	0.00773	0.00245	0.00077
2N481(E-B)	0.0	0.0	0.0	0.45908	0.24198	0.13520	0.45908	0.24198	0.13520	0.45908	0.24198	0.13520
2N2907A(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2907A(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N222A(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N222A(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N4384	0.0	0.0	0.0	0.39298	0.13612	0.05241	0.39298	0.13612	0.05241	0.39298	0.13612	0.05241
FS911-3465	0.0	0.0	0.0	0.18267	0.09749	0.04682	0.18267	0.09749	0.04682	0.18267	0.09749	0.04682
1N914	0.0	0.0	0.0	2.29408	1.39921	1.04891	2.29408	1.39921	1.04891	2.29408	1.39921	1.04891
1N21ME	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N914A	0.20360	0.34341	0.57017	0.11215	0.18916	0.31407	0.11215	0.18916	0.31407	0.11215	0.18916	0.31407
1N752A	0.0	0.0	0.0	0.48972	0.63444	1.35731	0.48972	0.63444	1.35731	0.48972	0.63444	1.35731
PC115	2.35117	1.96828	1.52161	0.0	0.0	0.0	2.35117	1.96828	1.52161	2.35117	1.96828	1.52161
1N3026B:JAN	0.0	0.0	0.0	0.90359	0.90302	0.90375	0.90359	0.90302	0.90375	0.90359	0.90302	0.90375
1N3611	0.0	0.0	0.0	0.59671	0.18871	0.05968	0.59671	0.18871	0.05968	0.59671	0.18871	0.05968
1N3995A	0.0	0.0	0.0	1.00000	1.00018	1.00018	1.00000	1.00018	1.00018	1.00000	1.00018	1.00018
1N3014B	0.0	0.0	0.0	1.77979	1.77867	1.78011	1.77979	1.77867	1.78011	1.77979	1.77867	1.78011
1N4141	0.0	0.0	0.0	1.39781	1.39693	1.39806	1.39781	1.39693	1.39806	1.39781	1.39693	1.39806
1002	0.0	0.0	0.0	0.11971	0.11964	0.11973	0.11971	0.11964	0.11973	0.11971	0.11964	0.11973
2N2857(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2857(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3375(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3375(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N1490JAN(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N1490JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3584(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3584(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2894(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2894(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N5829(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N5829(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3013JAN(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3013JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CA3018(C-B)	3.27550	3.57206	3.61499	0.0	0.0	0.0	3.27550	3.57206	3.61499	3.27550	3.57206	3.61499
CA3018(E-B)	18.33365	14.49531	10.08529	0.0	0.0	0.0	18.33365	14.49531	10.08529	18.33365	14.49531	10.08529
SM8526517(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SM8526517(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[illegible]

Q- EXPERIMENTAL POWER TO DAMAGE DEVICE - P- EXPERIMENTAL POWER TO DAMAGE DEVICE
Q-SAME AS D EXCEPT FOR SILICON DEVICES ONLY - P-SAME AS D EXCEPT FOR GERMANIUM DEVICES
Q-T-SAME AS Q EXCEPT FOR GERMANIUM DEVICES - P-T-SAME AS P EXCEPT FOR GERMANIUM DEVICES

APPENDIX A

[illegible]

APPENDIX A

	R	R	R	S	S	S	T	T	T	T
	10 USEC	1 USEC	0.1 USEC	10 USEC	1 USEC	0.1 USEC	10 USEC	1 USEC	0.1 USEC	T
2N1485EJAN(E-B)	0.939	3.615	13.910	0.936	2.872	8.780	0.835	3.218	12.384	
2N3439(C-B)	0.003	0.003	0.004	0.003	0.003	0.002	0.003	0.003	0.003	
2N3439(E-B)	0.054	0.075	0.106	0.054	0.059	0.067	0.049	0.067	0.094	
2N706EJAN(C-B)	0.018	0.042	0.092	0.018	0.034	0.058	0.017	0.041	0.089	
2N706EJAN(E-B)	0.003	0.045	0.050	0.043	0.036	0.031	0.041	0.043	0.048	
IR-69-6735	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1N258U	5.146	6.473	8.154	5.146	5.143	5.147	4.581	5.763	7.260	
1N751AEJAN	1.503	6.231	25.300	1.503	4.950	15.969	1.449	6.008	24.396	
1N485EJAN	0.626	1.084	1.984	0.626	0.861	1.252	0.604	1.045	1.913	
1N29018EJAN	3.027	3.808	4.797	3.027	3.025	3.028	2.695	3.390	4.271	
1N30258EJAN	0.424	1.687	6.715	0.424	1.340	4.239	0.377	1.502	5.979	
NO1054	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1N746AEJAN	16.278	49.846	152.593	16.279	39.603	96.314	15.696	48.065	147.141	
1N645EJAN	3.130	1.446	1.612	3.131	1.146	1.018	3.018	1.394	1.555	
1N1202RAJAN	0.030	0.120	0.432	0.030	0.096	0.272	0.027	0.107	0.384	
1N1731AEJAN	0.242	0.241	0.273	0.242	0.191	0.173	0.216	0.215	0.243	
2N404AE(E-B)	0.751	0.399	0.228	0.751	0.317	0.144	0.0	0.0	0.0	
2N297AE(E-B)	0.651	0.349	0.174	0.651	0.277	0.110	0.0	0.0	0.0	
2N297AE(E-B)	0.605	0.265	0.130	0.605	0.211	0.082	0.0	0.0	0.0	
2N297AE(E-B)	0.424	0.253	0.158	0.424	0.201	0.100	0.0	0.0	0.0	
2N526(E-B)	0.814	0.561	0.422	0.814	0.446	0.266	0.0	0.0	0.0	
2N526(E-B)	1.002	0.723	0.496	1.002	0.574	0.313	0.0	0.0	0.0	
1N27U	0.119	0.050	0.023	0.119	0.040	0.014	0.0	0.0	0.0	
2N396AE(E-B)	0.720	0.424	0.228	0.720	0.337	0.144	0.0	0.0	0.0	
2N396AE(E-B)	0.511	0.311	0.347	0.511	0.406	0.219	0.0	0.0	0.0	
2N428EJAN(C-B)	1.064	0.648	0.417	1.064	0.515	0.263	0.0	0.0	0.0	
2N428EJAN(E-B)	1.377	0.698	0.332	1.377	0.554	0.210	0.0	0.0	0.0	
2N393EJAN(C-B)	1.878	2.742	3.373	1.878	2.178	2.129	0.0	0.0	0.0	
2N393EJAN(E-B)	0.207	0.399	0.695	0.207	0.317	0.438	0.0	0.0	0.0	
2N501AEJAN(C-B)	0.019	0.042	0.085	0.019	0.034	0.054	0.0	0.0	0.0	
2N501AEJAN(E-B)	0.031	0.045	0.078	0.031	0.036	0.049	0.0	0.0	0.0	
2N705EJAN(C-B)	0.049	0.037	0.030	0.049	0.030	0.019	0.0	0.0	0.0	
2N705EJAN(E-B)	0.023	0.016	0.012	0.023	0.013	0.008	0.0	0.0	0.0	
2N468EJAN(C-B)	2.942	1.994	1.389	2.943	1.584	0.877	0.0	0.0	0.0	
2N468EJAN(E-B)	4.007	1.969	0.923	4.007	1.564	0.582	0.0	0.0	0.0	
2N1042RAJAN(C-B)	0.151	0.181	0.192	0.151	0.144	0.121	0.0	0.0	0.0	
2N1042RAJAN(E-B)	0.109	0.205	0.360	0.109	0.163	0.227	0.0	0.0	0.0	
1N277EJAN	0.088	0.045	0.023	0.088	0.036	0.014	0.0	0.0	0.0	
MS1040	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2N328AE(C-B)	0.121	0.099	0.085	0.0	0.0	0.0	0.0	0.0	0.0	
2N328AE(E-B)	0.054	0.031	0.018	0.0	0.0	0.0	0.0	0.0	0.0	
2N335E(C-B)	0.121	0.153	0.181	0.0	0.0	0.0	0.0	0.0	0.0	
2N335E(E-B)	0.121	0.084	0.060	0.0	0.0	0.0	0.0	0.0	0.0	
2N336EJAN(C-B)	0.181	0.134	0.097	0.0	0.0	0.0	0.0	0.0	0.0	
2N336EJAN(E-B)	0.423	0.214	0.377	0.0	0.0	0.0	0.0	0.0	0.0	
2N248AE(C-B)	0.254	0.088	0.030	0.0	0.0	0.0	0.0	0.0	0.0	
2N248AE(E-B)	0.091	0.092	0.097	0.0	0.0	0.0	0.0	0.0	0.0	
2N3736(C-B)	0.266	0.137	0.069	0.0	0.0	0.0	0.0	0.0	0.0	

APPENDIX A

2N3736(E-B)	0.664	0.497	0.356	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
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APPENDIX A

[illegible]

	U=	SAME AS	O	EXCEPT	MODEL LIMITED	TO DEVICES	WITHOUT	CAPACITANCE	DAMAGE	MODEL DATA
V=	SAME AS	SAME AS	P	EXCEPT	MODEL LIMITED	TO DEVICES	WITHOUT	CAPACITANCE	DAMAGE	MODEL DATA
W=	SAME AS	SAME AS	Q	EXCEPT	MODEL LIMITED	TO DEVICES	WITHOUT	CAPACITANCE	DAMAGE	MODEL DATA
X=	SAME AS	SAME AS	R	EXCEPT	MODEL LIMITED	TO DEVICES	WITHOUT	CAPACITANCE	DAMAGE	MODEL DATA
Y=	SAME AS	SAME AS	S	EXCEPT	MODEL LIMITED	TO DEVICES	WITHOUT	CAPACITANCE	DAMAGE	MODEL DATA
Z=	SAME AS	SAME AS	T	EXCEPT	MODEL LIMITED	TO DEVICES	WITHOUT	CAPACITANCE	DAMAGE	MODEL DATA

U	U	U	U	U	V	V	V	V	W	W	W	W
10 USEC	1 USEC	0.1 USEC	10 USEC	1 USEC	0.1 USEC	10 USEC	1 USEC	0.1 USEC	10 USEC	1 USEC	0.1 USEC	W
2M328A(C-B)	0.312	0.323	0.346	0.312	0.257	0.219	0.711	0.735	0.788			
2M328A(E-B)	0.140	0.099	0.074	0.140	0.079	0.047	0.320	0.226	0.189			
2M335(C-B)	0.312	0.497	0.442	0.312	0.395	0.468	0.711	1.131	1.689			
2M335(E-B)	0.312	0.273	0.247	0.312	0.217	0.156	0.711	0.622	0.563			
2M336(JAN(C-B)	0.468	0.435	0.396	0.468	0.345	0.250	1.066	0.990	0.901			
2M336(JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
2M248A(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
2M248A(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
2M373A(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
2M373A(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
2M930(C-B)	0.466	0.440	0.445	0.468	0.365	0.281	1.066	1.047	1.013			
2M930(E-B)	0.250	0.373	0.569	0.250	0.296	0.359	0.849	1.295	1.295			
2M248A(C-B)	0.156	0.062	0.156	0.156	0.049	0.016	0.355	0.141	0.056			
2M248A(E-B)	0.281	0.166	0.131	0.281	0.148	0.083	0.640	0.424	0.298			
2M297A(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
2M297A(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
2M222A(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
2M222A(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
1M4384	1.207	0.526	0.255	1.207	0.418	0.161	1.082	0.472	0.229			
5M911-3465	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
1M816	0.805	0.618	0.583	0.805	0.491	0.368	0.721	0.554	0.523			
1M21ME	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
1M914A	0.234	0.497	1.039	0.234	0.395	0.656	1.131	1.131	2.365			
1M752A	1.295	2.112	5.687	1.295	1.678	3.590	2.949	4.809	12.950			

PC115	0.293	0.309	0.301	0.293	0.245	0.190	0.263	0.277	0.269
1N30268:JAN	9.774	12.295	15.489	9.775	9.769	9.772	9.775	11.019	13.881
1N3611	1.725	0.687	0.273	1.725	0.546	0.173	1.546	0.615	0.245
1N3995A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N30168	7.474	9.402	11.845	7.475	7.470	7.476	6.698	8.426	10.615
1N4141	4.599	5.786	7.289	4.600	4.597	4.601	4.122	5.185	6.532
10D2	10.454	13.151	16.567	10.455	10.449	10.457	23.804	29.944	37.723
2N2857(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2857(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3375(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3375(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N1490:JAN(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N1490:JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3584(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3584(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2894(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2894(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N5829(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N5829(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3013:JAN(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3013:JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CA3018(C-B)	0.090	0.124	0.158	0.091	0.099	0.100	0.206	0.283	0.360
CA3018(E-B)	0.062	0.062	0.034	0.062	0.049	0.034	0.142	0.161	0.124
SMB526517(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SMB526517(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N1845	21.845	13.044	7.913	21.847	10.364	4.994	49.740	29.701	18.017
2N1813:JAN(C-B)	2.497	2.112	1.855	2.497	1.678	1.171	5.685	4.809	4.223
2N1813:JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N1485:JAN(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N1485:JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3439(C-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3439(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N706:JAN(C-B)	0.044	0.106	0.230	0.044	0.084	0.145	0.099	0.240	0.524
2N706:JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IR-69-6735	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N2580	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N751A:JAN	3.745	15.529	63.055	3.745	12.338	39.799	8.527	35.359	143.574
1N455B:JAN	1.560	2.702	4.945	1.560	2.147	3.121	3.553	6.152	11.261
1N2991B:JAN	5.749	7.232	9.111	5.750	5.746	5.751	5.153	6.482	8.166
1N3025B:JAN	0.805	3.204	12.756	0.805	2.546	8.051	0.721	2.872	11.432
W01054	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N746A:JAN	40.568	124.230	380.305	40.572	98.701	240.042	92.373	282.868	865.946
1N645:JAN	7.802	3.603	4.018	7.802	2.862	2.536	17.764	8.203	9.149
1N1202RA:JAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N1731A:JAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N404A(C-B)	1.872	0.994	0.569	1.873	0.790	0.359	0.0	0.0	0.0
2N404A(E-B)	1.623	0.870	0.433	1.623	0.691	0.273	0.0	0.0	0.0
2N297A(C-B)	1.150	0.504	0.246	1.150	0.400	0.155	0.0	0.0	0.0
2N297A(E-B)	0.805	0.481	0.301	0.805	0.382	0.190	0.0	0.0	0.0
2N526(C-B)	2.028	1.398	1.051	2.029	1.110	0.663	0.0	0.0	0.0
2N526(E-B)	2.497	1.801	1.236	2.497	1.431	0.780	0.0	0.0	0.0
1N270	0.296	0.124	0.057	0.296	0.099	0.036	0.0	0.0	0.0
2N396A(C-B)	1.794	1.056	0.569	1.795	0.839	0.359	0.0	0.0	0.0
2N396A(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N428M:JAN(C-B)	2.653	1.615	1.039	2.653	1.283	0.656	0.0	0.0	0.0
2N428M:JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N393:JAN(C-B)	4.681	6.833	8.407	4.681	5.429	5.307	0.0	0.0	0.0
2N393:JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N501A:JAN(C-B)	0.047	0.106	0.213	0.047	0.084	0.134	0.0	0.0	0.0
2N501A:JAN(E-B)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N705:JAN(C-B)	0.122	0.093	1.074	0.122	0.074	0.047	1.0	0.0	0.0

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	X	X	X	X	Y	Y	Y	Y	Y	Y	Z	Z	Z	Z
	10 USEC	1 USEC	0.1 USEC	10 USEC	1 USEC	0.1 USEC	1 USEC	0.1 USEC	1 USEC	0.1 USEC	1 USEC	0.1 USEC	1 USEC	0.1 USEC
2N755(JAN(E-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N466M(JAN(C-B))	7.334	4.969	3.462	7.334	3.948	2.185	7.334	3.948	2.185	7.334	3.948	2.185	7.334	3.948
2N466M(JAN(E-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N1042RAJAN(C-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N1042RAJAN(E-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N277(JAN	0.218	0.112	0.057	0.218	0.089	0.036	0.218	0.089	0.036	0.218	0.089	0.036	0.218	0.089
MS1.40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N328A(C-B))	0.711	0.584	0.498	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N328A(E-B))	0.320	0.180	0.107	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N335(C-B))	0.711	0.899	1.066	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N335(E-B))	0.711	0.494	0.355	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N336(JAN(C-B))	1.066	0.787	0.569	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N336(JAN(E-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2484(C-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2484(E-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3736(C-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3736(E-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N937(C-B))	1.166	0.832	0.647	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N930(E-B))	0.569	0.817	0.817	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2481(C-B))	1.355	0.112	0.036	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2481(E-B))	0.640	0.337	0.188	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2907A(C-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2907A(E-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2222A(C-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2222A(E-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N4384	1.082	0.375	1.144	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FS911-3465	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N816	1.721	0.440	0.333	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N21WE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N916A	0.533	0.899	1.493	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N752A	2.949	3.821	8.174	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PC115	9.263	0.220	0.170	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N3026B(JAN	8.760	8.755	8.762	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N3611	1.546	0.489	0.155	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N3995A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N3016B	6.699	6.695	6.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1N4141	4.122	4.120	4.123	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10D2	23.816	23.791	23.810	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2857(C-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2857(E-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3375(C-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3375(E-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N1490(JAN(C-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N1490(JAN(E-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3584(C-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N3584(E-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2894(C-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2N2894(E-B))	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

QUANTITIES A THROUGH J AND L THROUGH Z ORDERED BY MAGNITUDE

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23.58696	16.91402	15.56127	14.48369	12.93426	11.89980	10.46465	10.42854	9.10403	8.58823
4.52808	7.97478	6.46713	5.99118	5.11189	4.25009	4.05543	3.91071	3.11749	2.85318
2.61119	2.40498	2.40429	1.81431	1.81046	1.74115	1.63585	1.60994	1.60721	1.54493
1.52561	1.45925	1.39292	1.35674	1.32422	1.30108	1.24360	1.22889	1.19702	1.12760
0.99494	0.93809	0.91537	0.82220	0.79595	0.76039	0.70751	0.70170	0.68983	0.64371
0.64558	0.61344	0.59697	0.51486	0.51255	0.51209	0.50472	0.50403	0.50210	0.50210
0.49076	0.46431	0.43264	0.42003	0.40968	0.39799	0.38034	0.37889	0.37336	0.37336
0.35273	0.34079	0.30829	0.29692	0.28967	0.27889	0.25560	0.24921	0.24622	0.24622
0.24622	0.23538	0.24538	0.23630	0.21947	0.21369	0.21629	0.20645	0.19899	0.19899
0.19859	0.19501	0.18744	0.17963	0.17939	0.17412	0.17176	0.16449	0.14773	0.14484
0.13700	0.13632	0.13518	0.13496	0.13266	0.13266	0.13213	0.13183	0.13111	0.12269
0.11608	0.11587	0.13735	0.09949	0.09406	0.08793	0.08755	0.08742	0.08690	0.08497
0.08365	0.08207	0.08125	0.08077	0.07960	0.07821	0.07342	0.07239	0.07157	0.07145
0.07055	0.06543	0.06518	0.06368	0.06169	0.06134	0.05793	0.05751	0.05685	0.05649
0.05527	0.05306	0.05174	0.04975	0.04975	0.04975	0.04975	0.04975	0.04908	0.04776
0.04703	0.04601	0.04522	0.04287	0.04171	0.04146	0.04090	0.04022	0.03930	0.03869
0.03862	0.03768	0.03766	0.03701	0.03681	0.03681	0.03316	0.02985	0.02945	0.02897
0.02897	0.02764	0.02726	0.02699	0.02633	0.02535	0.02487	0.02462	0.02462	0.02414
0.02414	0.02388	0.02317	0.02300	0.02255	0.02239	0.02173	0.02147	0.02139	0.02080
0.02070	0.01931	0.01924	0.01902	0.01821	0.01791	0.01764	0.01764	0.01738	0.01738
0.01725	0.01704	0.01690	0.01687	0.01641	0.01529	0.01468	0.01448	0.01442	0.01411
0.01327	0.01309	0.01275	0.01227	0.01128	0.01127	0.01159	0.01159	0.01063	0.01022
0.01004	0.00995	0.00966	0.00929	0.00929	0.00903	0.00883	0.00886	0.00829	0.00829
0.00805	0.00782	0.00725	0.00675	0.00663	0.00578	0.00573	0.00511	0.00491	0.00478
0.00473	0.00460	0.00450	0.00418	0.00377	0.00352	0.00312	0.00310	0.00251	

19.20517	17.24905	14.09522	13.19046	13.11916	10.77875	8.52059	8.49124	6.99276	6.59523
6.49348	4.63029	3.67336	3.18421	2.70373	2.66291	2.21101	2.17778	1.85024	1.77564
1.63989	1.43935	1.42051	1.38361	1.33195	1.32685	1.31087	1.26831	1.08425	1.01465
0.82913	0.71560	0.68878	0.65317	0.60879	0.58476	0.49448	0.47350	0.46422	0.45655
0.41780	0.40586	0.39959	0.38046	0.35780	0.35227	0.30864	0.30850	0.28720	0.22565
0.22582	0.22322	0.22303	0.21054	0.20812	0.20293	0.20293	0.20293	0.20292	0.19979
0.19979	0.19887	0.19591	0.18264	0.16978	0.16268	0.13994	0.13529	0.13529	0.13444
0.13382	0.13119	0.12245	0.11818	0.11151	0.10989	0.10753	0.10147	0.09990	0.08929
0.08117	0.07697	0.07118	0.07084	0.06811	0.06494	0.06472	0.06291	0.05894	0.05637
0.05411	0.05328	0.05248	0.05116	0.05073	0.05073	0.05073	0.04995	0.04870	0.04883
0.04612	0.04461	0.04228	0.03996	0.03946	0.03883	0.03829	0.03778	0.03746	0.03644
0.03498	0.03477	0.03411	0.03382	0.03353	0.03330	0.03044	0.02997	0.02997	0.02918
0.02398	0.02385	0.02359	0.02300	0.02296	0.02283	0.02230	0.02220	0.02198	0.02187
0.02187	0.02181	0.02122	0.02099	0.01992	0.01759	0.01749	0.01748	0.01686	0.01574
0.01568	0.01531	0.01487	0.01387	0.01374	0.01353	0.01353	0.01329	0.01312	0.01212
0.01149	0.01149	0.01066	0.01050	0.01050	0.01015	0.00947	0.00947	0.00875	0.00866
0.00846	0.00832	0.00817	0.00805	0.00735	0.00729	0.00721	0.00708	0.00694	0.00590
0.00549	0.00466	0.00426	0.00416	0.00390	0.00375	0.00366	0.00341	0.00205	0.00139

14.72055	12.49399	8.11673	4.04033	3.03070	2.96712	2.12019	2.09369	1.61731	1.41433
1.38886	1.07321	0.93952	0.89284	0.75752	0.74207	0.68906	0.67339	0.65655	0.61552
0.54713	0.54450	0.51238	0.42430	0.42404	0.40747	0.39754	0.37791	0.33863	0.33791

APPENDIX A

0.33676	0.28623	0.26519	0.23235	0.22490	0.21720	0.19952	0.17679	0.17427	0.16572
0.11926	0.11264	0.09938	0.08945	0.07733	0.05683	0.05411	0.04924	0.04735	0.04357
0.04357	0.03975	0.03788	0.03379	0.02031	0.03031	0.02982	0.02499	0.02385	0.02357
0.02273	0.01749	0.01705	0.01429	0.01212	0.01169	0.010631	0.00292	0.00126	
63.42088	50.89406	49.87672	47.36977	38.91898	38.14102	29.77527	28.04044	25.16792	23.09212
21.44269	16.7051	16.02310	13.26353	10.51517	9.19297	7.98338	7.86338	7.82380	7.69997
5.97122	5.13437	5.05277	4.73942	4.39850	4.32888	4.10744	4.00081	3.66741	3.2512
2.99377	2.93392	2.48691	2.34714	2.11139	2.08635	2.76919	2.03419	1.76035	1.69516
1.68701	1.67616	1.64944	1.64067	1.64215	1.53948	1.37372	1.31955	1.29190	1.22109
1.17377	1.16329	1.11458	1.01877	1.01055	0.94843	0.94739	0.82424	0.80529	0.80529
0.65641	0.67068	0.65978	0.64719	0.60879	0.58679	0.58679	0.51344	0.50528	0.46184
0.44212	0.40264	0.39119	0.39119	0.38434	0.35526	0.32989	0.31156	0.29339	0.27790
0.26843	0.25291	0.23685	0.23642	0.23369	0.22492	0.21316	0.19243	0.18969	0.18448
0.17594	0.16765	0.15648	0.15463	0.15256	0.14670	0.14670	0.14670	0.12446	0.12316
0.11736	0.10996	0.09897	0.09474	0.08150	0.07895	0.06601	0.06316	0.05955	0.05773
0.05644	0.05672	0.05369	0.05113	0.04742	0.04742	0.03912	0.03790	0.03519	0.03299
0.03158	0.02738	0.02632	0.02428	0.01956	0.01742	0.01555	0.01237	0.01210	0.00695
0.10458	0.00137								
90.58205	69.26882	59.62102	58.34615	55.49240	45.59254	34.63432	25.79674	21.24437	19.72691
15.53787	14.27895	13.98636	9.67378	9.35232	9.32462	9.21174	8.60734	7.45970	7.28594
6.93655	6.66045	5.32836	4.04555	3.98250	3.75789	3.50712	3.19701	2.91335	2.47344
2.13124	1.96358	1.93114	1.60928	1.51746	1.51343	1.30570	1.21396	1.17537	1.10563
1.07020	1.06567	1.06567	0.94377	0.93725	0.87254	0.71045	0.71045	0.61647	0.60698
0.59192	0.53284	0.51793	0.47169	0.32684	0.32556	0.30349	0.28618	0.27376	0.26442
0.26642	0.22197	0.20693	0.16186	0.14801	0.14228	0.14226	0.11989	0.11634	0.10301
0.10116	0.09249	0.09105	0.07399	0.07104	0.06289	0.05311	0.04973	0.04704	0.04439
0.03699	0.03237	0.03083	0.02234	0.01138	0.01113	0.00422			
24.16864	18.99904	9.17362	3.35347	3.22408	2.32209	1.21296	1.04783	0.85620	0.77915
0.76107	0.74204	0.69663	0.64482	0.61837	0.61540	0.60451	0.56421	0.55288	0.51394
0.46995	0.38149	0.35661	0.29026	0.28611	0.25419	0.18729	0.17128	0.15113	0.13402
0.07153	0.07153	0.06116	0.06045	0.05565	0.05351	0.04976	0.04281	0.03800	0.03627
0.02346	0.01919	0.00714	0.00443	0.00707					
26.67963	11.83466	10.94316	9.71422	4.42344	4.23573	3.86229	3.06408	1.36789	1.18820
0.14039	0.91231	0.80737	0.90441	0.85216	0.81456	0.69387	0.69161	0.65165	0.59452
0.55511	0.39099	0.38082	0.21735	0.28189	0.27755	0.27755	0.26833	0.26066	0.18822
0.14162	0.14162	0.13570	0.13033	0.13033	0.12772	0.11730	0.10943	0.09888	0.09302
0.06565	0.06565	0.05244	0.04163	0.04140	0.04620	0.03331	0.03277	0.03239	0.03128
0.03040	0.02962	0.02534	0.02172	0.02151	0.01990	0.01955	0.01927	0.01915	0.01860
0.11824	0.01751	0.01631	0.01460	0.01477	0.01459	0.01401	0.01363	0.01313	0.01277
0.01240	0.01240	0.01203	0.01156	0.01155	0.01135	0.01130	0.01109	0.01094	0.01002

APPENDIX A

0.00875	0.00869	0.00820	0.00778	0.00763	0.00733	0.00671	0.00652	0.00648	0.00608
1.00608	0.00591	0.00578	0.00543	0.00541	0.00509	0.00285	0.00284	0.00274	
93.53462	47.19267	19.25713	19.25011	9.58228	8.98666	8.00845	7.90835	7.03699	6.86439
5.96971	3.29391	2.80296	2.69600	2.60275	2.54529	2.15038	2.11751	1.88500	1.53912
1.45980	1.38009	1.29136	1.27635	1.26776	1.10728	0.45048	0.42545	0.39302	0.36107
0.33786	0.27682	0.19257	0.19257	0.18341	0.15016	0.12763	0.11678	0.11262	0.11229
0.07703	0.06617	0.05615	0.05390	0.04943	0.04197	0.03101	0.03002		
31.69415	24.23649	16.83386	12.87296	6.90781	5.28245	4.97163	4.89295	3.01164	2.64061
2.60091	2.54231	1.31487	1.08358	1.04643	0.87004	0.69837	0.55441	0.42731	0.41126
0.41016	0.38686	0.37287	0.36866	0.28658	0.26636	0.25098	0.24858	0.24858	0.24703
0.23398	0.23365	0.21751	0.18644	0.16931	0.16713	0.16406	0.15982	0.14915	0.14624
0.11932	0.09943	0.09322	0.09322	0.09322	0.09192	0.08752	0.08461	0.08127	0.07768
0.07730	0.06267	0.06111	0.05541	0.05327	0.05179	0.04795	0.04512	0.04334	0.04195
0.04178	0.04152	0.04074	0.04004	0.03251	0.03115	0.02709	0.02611	0.02438	0.01806
0.01788	0.01422	0.01371	0.01253	0.01117	0.00935	0.00870	0.00598	0.00564	0.00305
0.00113									
0.60458	0.53741	0.52397	0.43664	0.38767	0.32083	0.30078	0.28073	0.24604	0.20914
0.17949	0.16977	0.12917	0.07520	0.03418	0.03183	0.03023	0.01891	0.01805	0.01044
0.00854									
18.33365	14.70956	14.49531	10.08529	6.97798	3.61499	3.57206	3.36278	3.27550	2.35117
1.96828	1.63581	1.52161	1.27609	1.21057	0.98166	0.69971	0.57017	0.36441	0.34341
1.31113	0.26234	0.20738	0.21360	0.15579	0.14596	0.10771	0.07786	0.04927	0.01958
0.01610	0.01558	0.01371							
14.14206	6.73626	5.92027	5.81498	5.55653	4.98601	4.91271	4.68527	3.30155	2.42220
2.39030	2.36528	2.30324	2.29408	1.87199	1.78011	1.77979	1.77867	1.39921	1.39806
1.39781	1.39693	1.35731	1.13986	1.12968	1.12948	1.12877	1.04891	1.03539	1.00018
1.00018	1.00000	0.90375	0.90359	0.90302	0.75088	0.71207	0.63444	0.59671	0.59192
1.51761	0.48972	0.45908	0.45396	0.43924	0.39298	0.35413	0.31407	0.27242	0.24198
0.22793	0.21587	0.18916	0.18871	0.18267	0.16114	0.15020	0.14278	0.13612	0.13520
0.11973	0.11971	0.11964	0.11215	0.10796	0.09749	0.08625	0.07557	0.06214	0.05968
0.05291	0.05241	0.05129	0.04869	0.04682	0.04325	0.03419	0.02876	0.00773	0.00245
0.0077									

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18.33365	14.449531	14.14206	10.08529	6.73626	5.92027	5.81498	5.55653	4.98601	4.91271
4.68527	3.61499	3.57266	3.30155	3.27550	2.42220	2.39030	2.36528	2.35117	2.30324
2.29408	1.96828	1.87199	1.78011	1.77799	1.77867	1.52161	1.39921	1.39806	1.39781
1.39693	1.35731	1.21057	1.13986	1.12968	1.12948	1.12877	1.04891	1.03539	1.00018
1.00018	1.00000	0.90375	0.90359	0.90302	0.75088	0.71267	0.69971	0.63444	0.59671
0.59192	0.5176	0.48972	0.45908	0.45396	0.43924	0.39298	0.36441	0.35413	0.31407
0.27262	0.24198	0.22793	0.21587	0.18916	0.18871	0.18267	0.16314	0.15020	0.14596
0.14278	0.13612	0.13520	0.11971	0.11971	0.11964	0.11215	0.10796	0.10771	0.09749
0.08625	0.07786	0.07557	0.06214	0.05968	0.05291	0.05241	0.05129	0.04849	0.04682
0.14325	0.13419	0.12876	0.10073	0.00245	0.00077				
152.59288	49.84566	25.29985	16.27759	13.91037	8.76486	8.15436	8.15436	6.71535	6.64741
6.47266	6.47266	6.23568	6.23071	5.27666	5.23379	5.14551	5.14551	4.96983	4.79668
4.19461	4.00679	3.93480	3.83734	3.80756	3.61478	3.37331	3.17488	3.13031	3.04605
3.02677	2.94249	2.74151	2.42142	2.28195	1.99383	1.98430	1.96890	1.87816	1.86890
1.81225	1.50255	1.44552	1.38901	1.37733	1.38414	1.06430	1.00170	1.00170	0.93830
0.92270	0.90803	0.84738	0.84738	0.81388	0.81388	0.75127	0.74411	0.72276	0.71997
0.69764	0.69451	0.68867	0.65111	0.64799	0.63562	0.63553	0.62606	0.62357	0.62009
0.60535	0.58537	0.56076	0.51963	0.51092	0.49608	0.47967	0.45787	0.43824	0.43170
0.42375	0.42375	0.42375	0.42369	0.42166	0.41670	0.41670	0.39877	0.39877	0.39686
0.39348	0.36148	0.35975	0.34892	0.34725	0.33646	0.33577	0.33237	0.33161	0.32533
0.30609	0.29765	0.27914	0.27713	0.27547	0.27341	0.26508	0.26508	0.26295	0.25906
0.25303	0.25042	0.24095	0.22819	0.22819	0.22819	0.22819	0.21827	0.21827	0.21187
0.21184	0.20664	0.20334	0.19938	0.19938	0.19938	0.19440	0.19187	0.18782	0.18782
0.18643	0.18074	0.17944	0.17859	0.17446	0.17363	0.16867	0.16266	0.15874	0.15874
0.15829	0.15437	0.15437	0.15134	0.15134	0.14954	0.14831	0.14390	0.13890	0.13431
0.13254	0.13209	0.12960	0.12951	0.12951	0.12521	0.12521	0.12521	0.12521	0.12521
0.12461	0.12449	0.12049	0.11963	0.11906	0.11895	0.11465	0.11410	0.11269	0.10966
0.10914	0.10896	0.10553	0.10017	0.09922	0.09922	0.09391	0.09277	0.09277	0.08765
0.08765	0.08634	0.08533	0.08154	0.07851	0.07838	0.07763	0.07513	0.07477	0.07471
0.08962	0.08350	0.08261	0.07661	0.07556	0.06535	0.06448	0.05302	0.05258	0.05234
0.05159	0.04985	0.04855	0.04661	0.04661	0.04661	0.04735	0.04683	0.04486	0.04486
0.04486	0.04458	0.04257	0.04237	0.04237	0.04237	0.03988	0.03756	0.03756	0.03738
0.03632	0.03431	0.03068	0.03027	0.02976	0.02976	0.02976	0.02692	0.02692	0.02504
0.02492	0.02492	0.02492	0.02282	0.02282	0.02254	0.02183	0.02183	0.01878	0.01753
0.01845	0.01191	0.00992	0.00814	0.00648	0.00526	0.00374	0.00325	0.00303	
96.31378	39.60262	16.27904	15.96860	9.77997	8.76564	5.14688	5.14688	5.14597	5.14597
5.14272	5.14272	4.95033	4.23861	4.19572	4.19498	4.19233	4.15827	4.00715	3.93585
3.93515	3.93267	3.13056	3.02757	3.02704	3.02513	2.94275	2.87196	2.42206	2.42163
2.42017	2.17814	2.12917	2.03393	1.87835	1.58410	1.56430	1.50268	1.46032	1.37746
1.34025	1.25245	1.14848	1.06440	1.00179	1.00179	1.00179	0.93838	0.90811	0.87672
0.86136	0.81395	0.81395	0.75134	0.72003	0.68873	0.67324	0.65116	0.63548	0.63548
0.66132	0.60541	0.58239	0.57424	0.55444	0.51968	0.51483	0.46967	0.44553	0.44553
0.43816	0.43828	0.42379	0.42379	0.42379	0.40593	0.39358	0.39352	0.36947	0.36947
0.36378	0.33662	0.33184	0.31682	0.31311	0.30276	0.30276	0.27722	0.27549	0.26216
0.27248	0.26732	0.26615	0.26302	0.26297	0.26297	0.25848	0.25049	0.25045	0.24216
0.22707	0.22177	0.22018	0.22018	0.21918	0.21193	0.21189	0.21189	0.21081	0.20979
0.20582	0.20582	0.20174	0.20036	0.19376	0.19166	0.18787	0.18784	0.18784	0.17257
0.16831	0.16214	0.15841	0.15841	0.15445	0.15438	0.15135	0.15135	0.14833	0.14653

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0.14403	0.14403	0.14257	0.13861	0.13777	0.12924	0.12522	0.12522
0.12522	0.12522	0.11896	0.11881	0.11272	0.11270	0.10959	0.10897
0.10646	0.10531	0.10297	0.10200	0.10018	0.09991	0.09901	0.09901
0.09573	0.09505	0.09392	0.09109	0.09032	0.08767	0.08766	0.08766
0.08713	0.08454	0.08174	0.07815	0.07513	0.07302	0.06962	0.06888
0.06661	0.06262	0.06261	0.05940	0.05935	0.05824	0.05635	0.05450
0.05449	0.05386	0.05147	0.04947	0.04884	0.04558	0.04008	0.03960
0.03960	0.03936	0.03757	0.03632	0.03631	0.03564	0.03564	0.03564
0.03562	0.03366	0.03366	0.03356	0.03168	0.03168	0.03131	0.03131
0.03168	0.03027	0.02970	0.02943	0.02892	0.02892	0.02594	0.02594
0.01980	0.01879	0.01879	0.01753	0.01753	0.01440	0.01378	0.01378
0.01307	0.00751	0.00626	0.00514	0.00303	0.00258	0.00236	0.00236
147.14079	48.06470	24.39590	15.69671	12.38450	7.25988	6.40990	6.00809
5.97872	5.76283	5.76283	5.55167	5.08813	4.58108	4.40887	4.27052
4.04474	3.50318	3.41641	3.38990	3.21826	2.71192	2.69476	2.20041
2.15580	1.91340	1.55464	1.50185	1.44886	1.04541	0.83537	0.81710
0.81710	0.80843	0.71753	0.66476	0.61283	0.59794	0.56445	0.55517
0.50106	0.42705	0.42258	0.40745	0.40181	0.38248	0.37727	0.35032
0.32444	0.32183	0.31996	0.29894	0.28964	0.27331	0.26562	0.25355
0.24673	0.24673	0.24342	0.24148	0.23064	0.21558	0.21047	0.20428
0.19318	0.19226	0.19226	0.18663	0.18663	0.18111	0.17784	0.17303
0.17221	0.16823	0.16264	0.15307	0.14882	0.14093	0.13743	0.13474
0.13394	0.13204	0.12915	0.12812	0.12574	0.12074	0.12074	0.12074
0.12074	0.12016	0.11957	0.11800	0.11536	0.11055	0.10866	0.10728
0.10728	0.10574	0.10524	0.09659	0.09567	0.09255	0.09055	0.08897
0.08422	0.07687	0.07570	0.07486	0.07260	0.07120	0.06198	0.06123
0.06037	0.05552	0.05433	0.05125	0.05071	0.04975	0.04806	0.04784
0.04784	0.04720	0.04566	0.04497	0.04326	0.04086	0.03969	0.03845
0.03845	0.03622	0.03511	0.03234	0.02870	0.02695	0.02596	0.02415
0.02403	0.02403	0.02403	0.02105	0.02105	0.00957	0.00625	0.00507
0.00333	0.00290	0.00269	0.02105	0.02105	0.00957	0.00625	0.00507
92.87251	36.18762	15.69740	15.39824	6.45245	4.77345	4.58230	4.58149
4.58149	4.57866	4.57866	4.04581	4.04510	4.00970	3.50411	3.50349
3.50128	3.01873	2.69547	2.69599	2.69329	2.15638	2.15643	1.93233
1.44849	1.38886	1.20770	1.19323	1.10744	0.96599	0.83545	0.80850
0.66412	0.64919	0.64919	0.60375	0.56595	0.50111	0.48689	0.42262
0.37733	0.37733	0.35627	0.35041	0.35035	0.31999	0.28955	0.25777
0.25569	0.25362	0.25357	0.24759	0.24154	0.23012	0.21560	0.19603
0.19603	0.19327	0.18868	0.18865	0.18865	0.18112	0.18112	0.17251
0.17046	0.16220	0.15364	0.15275	0.15275	0.14129	0.13889	0.13744
0.13475	0.13366	0.13285	0.13205	0.12075	0.12075	0.12075	0.11506
0.11656	0.10869	0.10867	0.10265	0.10120	0.09662	0.09662	0.09547
0.19375	0.19165	0.19056	0.19056	0.08895	0.08523	0.08454	0.08452
0.08401	0.08152	0.08086	0.07547	0.07486	0.07245	0.06944	0.06198
0.16339	0.16039	0.16037	0.16015	0.09330	0.05616	0.05434	0.04852
0.04451	0.04482	0.04105	0.04010	0.03665	0.03750	0.03628	0.03504
0.13502	0.13437	0.13246	0.13246	0.03246	0.03246	0.03154	0.03055
0.03055	0.03019	0.03019	0.02838	0.02895	0.02596	0.02415	0.01909
0.01909	0.01812	0.01812	0.01690	0.01690	0.00604	0.00496	0.00495
0.00269	0.00230	0.00210	0.01690	0.01690	0.00604	0.00496	0.00495

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4.35654	3.19933	2.98081	2.16786	2.14077	2.04213	1.87793	1.51026	1.49756
1.31455	1.11602	1.08913	1.00324	0.88492	0.88492	0.82234	0.81685	0.78585
0.78496	0.75875	0.75513	0.70794	0.7456	0.63545	0.60971	0.59521	0.58089
0.55552	0.49105	0.46948	0.46067	0.45847	0.45308	0.43357	0.43357	0.40177
0.37938	0.36138	0.33803	0.24811	0.24811	0.22463	0.18878	0.12933	0.09530
0.09277	0.05420	0.05310	0.04878	0.04878	0.04607	0.04065	0.03335	0.03236
0.24931	0.2451	0.2042	0.1788	0.1295				
4.35693	3.19962	2.31502	2.04231	1.87810	1.72238	1.70095	1.49769	1.31467
1.15731	1.8923	0.80500	0.86500	0.81692	0.78269	0.70800	0.70441	0.65336
0.63223	0.62366	0.60283	0.55977	0.50487	0.48442	0.47662	0.46952	0.44547
0.46136	0.36601	0.34448	0.36448	0.34044	0.33806	0.30994	0.30142	0.28438
0.28597	0.23831	0.22810	0.22465	0.15660	0.15660	0.12935	0.11916	0.09531
0.05856	0.05310	0.04306	0.03875	0.03875	0.03660	0.03336	0.03229	0.02451
0.02043	0.02042	0.01566	0.01421	0.01017				
380.30542	124.22978	63.05457	21.84456	16.56728	15.52472	15.48913	13.15096	13.04413
12.75575	12.29514	11.84463	9.77386	9.40216	9.11125	8.40728	7.91273	7.80163
7.47612	7.33353	7.28900	6.83764	5.78595	5.74933	5.68727	4.96919	4.94546
4.68098	4.59946	4.4018	3.60266	3.46182	3.20424	2.70200	2.65255	2.49852
2.49852	2.11191	2.02842	1.67239	1.85455	1.80133	1.79437	1.72480	1.62274
1.61499	1.56033	1.29597	1.23636	1.20736	1.14987	1.05595	1.05091	1.03855
1.03855	0.99364	0.86961	0.80491	0.80491	0.74182	0.68662	0.61796	0.58312
0.56873	0.56873	0.56873	0.50551	0.49892	0.49892	0.48044	0.46810	0.46810
0.45965	0.44509	0.43480	0.39564	0.37269	0.34618	0.32300	0.31207	0.31207
0.31207	0.31088	0.30067	0.29646	0.29322	0.28786	0.27334	0.27331	0.25511
0.24965	0.24727	0.24600	0.22496	0.21845	0.21265	0.18634	0.15825	0.15603
0.14083	0.13105	0.12423	0.12171	0.11181	0.10560	0.10560	0.09938	0.09317
0.09050	0.07418	0.067418	0.06211	0.06211	0.05687	0.05687	0.05460	0.04681
0.04369	0.2473							
240.04161	96.70116	40.57208	21.44451	12.33765	10.45696	10.45512	10.44850	10.36362
9.77644	9.77472	9.76854	7.80233	7.47610	7.47474	7.47006	7.33419	5.75085
5.74984	5.74420	5.42856	4.99437	4.68140	4.60068	4.59987	4.59696	3.94805
3.74512	3.58970	3.12148	2.85279	2.54578	2.53620	2.49674	2.49674	2.18504
2.14675	2.02860	1.87256	1.72495	1.67792	1.67792	1.62268	1.56046	1.43117
1.29519	1.28311	1.2747	1.14997	1.11039	0.83896	0.80498	0.80498	0.80498
0.78941	0.78037	0.69091	0.65551	0.65551	0.56553	0.49097	0.46814	0.46814
0.46814	0.41824	0.40005	0.39480	0.38187	0.36519	0.35897	0.35897	0.35897
0.34545	0.31209	0.31209	0.31209	0.29649	0.29610	0.29324	0.28093	0.28088
0.27313	0.24972	0.24972	0.24549	0.24307	0.21850	0.21847	0.21714	0.18978
0.18978	0.17252	0.16102	0.15607	0.15527	0.14805	0.14515	0.14044	0.13422
0.12172	0.09989	0.09870	0.09051	0.08883	0.08390	0.08390	0.08272	0.07896

APPENDIX A

1.77413	0.06242	0.04935	0.04682	0.04681	0.03590	0.03590
0.03434	0.01561					
865.94580	282.66792	143.57362	92.37343	49.73954	37.72325	35.35951
17.76411	13.88148	12.94978	11.43181	11.01901	10.61525	10.46441
8.52678	8.42630	8.20317	8.16558	6.69837	6.53246	6.48177
1.52259	4.80876	4.80876	4.22275	4.12208	3.55282	2.89884
0.54552	1.29498	1.13147	1.13147	1.08204	1.06585	1.04595
0.00000	0.84860	0.78825	0.73546	0.72136	0.71056	0.71056
0.00000	0.81536	0.56845	0.56303	0.55362	0.52362	0.52362
0.00000	0.35528	0.31975	0.29841	0.28287	0.27691	0.26946
0.00000	0.22629	0.20006	0.16891	0.14211	0.14143	0.14143
23.80391						
8.75941						
5.18542						
1.88910						
0.99004						
0.63951						
0.42430						
0.24044						
0.05630						
29.70214						
9.14930						
5.68452						
2.36474						
1.01346						
0.63951						
0.71056						
0.42430						
0.24044						
0.05630						
29.94441						
10.61525						
6.15238						
2.87167						
1.04661						
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0.42430						
0.24044						
0.05630						
23.79097						
7.10753						
4.88810						
1.54591						
0.72143						
0.56860						
0.33050						
0.17979						
0.03554						
23.80603						
7.21554						
5.14979						
2.78155						
0.81737						
0.56860						
0.33050						
0.17979						
0.03554						
23.81025						
8.17366						
5.15305						
2.86532						
0.83154						
0.56860						
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28.09250						
8.52754						
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49.74396						
3.75465						
5.68502						
3.55314						
0.89896						
0.67422						
0.44001						
0.22474						
0.11223						
90.62103						
8.76173						
5.77487						
3.82058						
1.06594						
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0.22744						
0.14212						
92.38164						
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0.22744						
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0.98805						
0.39365						
0.07928						
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QUANTITIES A THROUGH J AND L THROUGH Z ORDERED BY MAGNITUDE

SILICON DEVICES ONLY FOR L, M, AND N

FOR VALUES OF A THROUGH J AND L THROUGH Z LESS THAN 1, VALUE TABULATED IS INVERSE OF THE VALUE LESS THAN 1

1956-16553	586-84961	470-34878	397-59468	265-55054	239-30551	222-29169	217-35172	211-31424	208-99220
203-76726	195-61659	174-65759	172-89368	150-76247	146-19338	137-93478	127-85776	124-27774	120-60995
117-36996	112-85571	112-57042	110-72635	107-68761	107-68738	105-56777	100-50828	99-61955	97-80829
94-04640	86-30399	86-30399	84-14662	81-50691	81-50691	78-45815	76-41272	75-38114	70-87558
69-36758	69-04317	68-13472	65-40935	60-92046	59-27774	59-17987	58-68497	57-98553	57-53598
57-53598	56-70045	56-70045	55-23792	54-92072	52-58510	51-98700	51-76238	48-30037	48-00917
46-74003	46-57536	46-02878	44-67032	44-34186	43-47034	43-15198	41-87843	41-42590	41-42590
40-61363	40-61362	40-29329	39-45325	37-97374	37-74860	36-67810	36-18295	34-52158	34-52055
33-96121	33-50275	30-15247	27-16896	27-16896	27-01689	26-55507	26-05402	25-89119	25-84497
25-12706	24-85555	24-45206	24-12196	23-97333	23-58696	23-32539	22-11182	21-73517	21-26266
20-93922	20-37672	20-30681	20-10165	20-10164	20-10164	20-10164	19-32851	18-84529	18-09148
17-70337	17-58894	17-28816	17-26079	16-91402	16-30138	16-21100	15-70442	15-56127	15-34293
15-28255	14-48369	14-17512	13-99524	13-97262	13-81474	13-80863	12-93426	12-78578	12-56353
12-30800	12-30714	12-18409	11-95435	11-89960	11-76873	11-50720	11-43957	11-42139	11-37306
10-63134	10-46465	10-42856	1-25082	9-31518	9-10403	8-63115	8-61699	8-58823	8-52808
8-15069	8-12273	7-97478	7-58553	7-56850	7-53812	7-53812	7-40972	7-39748	7-33562
7-29913	6-91432	6-76894	6-47200	6-46713	5-95918	5-82192	5-74333	5-50379	5-50800
5-33515	5-12797	5-11189	5-02561	5-02561	5-02561	4-84377	4-62543	4-56856	4-55638
4-24509	4-23193	4-07535	4-07535	4-06136	4-06136	4-05543	4-01414	4-01265	3-91233
3-91071	3-69874	3-45216	3-36796	3-23640	3-11749	2-93434	2-83502	2-67840	2-65318
2-63927	2-62925	2-61119	2-53158	2-51271	2-44988	2-44988	2-40291	2-30880	2-31139
2-15375	2-03767	1-99163	1-98400	1-95122	1-84937	1-81531	1-81046	1-74797	1-74658
1-74115	1-73957	1-67514	1-63585	1-63014	1-60996	1-60996	1-54900	1-54628	1-54493
1-52561	1-45925	1-44964	1-42512	1-41340	1-39292	1-35674	1-32422	1-31511	1-30108
1-25635	1-24658	1-24368	1-22689	1-19702	1-12760	1-09245	1-06400	1-00508	
PARAMETERS IMMEDIATELY ABOVE VS. PER CENT CONFIDENCE LEVEL									
1956-17 99-6	586-85 99-2	470-35 99-8	397-59 98-4	265-55 98-0	239-31 97-6	222-29 97-2	217-35 97-2	211-31 97-2	208-99 97-2
217-35 96-8	211-31 96-4	208-99 96-0	203-77 95-6	195-62 95-2	174-66 94-8	172-89 94-4	172-89 94-4	172-89 94-4	172-89 94-4
150-76 94-0	148-19 93-6	137-93 93-2	127-86 92-8	124-28 92-4	120-61 92-0	117-37 91-6	117-37 91-6	117-37 91-6	117-37 91-6
112-86 91-2	112-57 90-8	110-73 90-4	107-69 90-0	107-69 89-6	103-56 89-2	100-51 88-8	100-51 88-8	100-51 88-8	100-51 88-8
99-62 88-4	97-61 88-0	94-05 87-6	86-31 87-2	86-31 86-7	84-15 86-3	81-51 85-9	81-51 85-9	81-51 85-9	81-51 85-9
81-51 85-5	78-46 85-1	76-41 84-7	75-38 84-3	70-86 83-9	69-37 83-5	69-04 83-1	69-04 83-1	69-04 83-1	69-04 83-1
68-13 82-7	65-61 82-3	60-92 81-9	59-28 81-5	59-18 81-1	58-46 80-7	57-99 80-3	57-99 80-3	57-99 80-3	57-99 80-3
57-54 79-9	57-54 79-5	56-70 79-1	56-70 78-7	55-84 78-3	54-92 77-9	52-59 77-5	52-59 77-5	52-59 77-5	52-59 77-5
51-99 77-1	51-78 76-7	48-23 76-3	48-23 75-9	46-75 75-5	46-58 75-1	46-03 74-7	46-03 74-7	46-03 74-7	46-03 74-7
44-67 74-3	44-34 73-9	43-47 73-5	43-15 73-1	41-88 72-7	41-43 72-3	41-43 71-9	41-43 71-9	41-43 71-9	41-43 71-9
40-61 71-5	40-21 70-7	39-45 70-3	39-45 70-3	37-97 69-9	37-05 69-5	36-68 69-1	36-68 69-1	36-68 69-1	36-68 69-1
36-18 68-7	34-52 68-3	34-52 67-9	33-96 67-5	33-50 67-1	30-15 66-7	27-17 66-3	27-17 66-3	27-17 66-3	27-17 66-3
27-17 65-9	27-2 65-5	26-56 65-1	26-05 64-7	25-89 64-3	25-13 63-9	25-13 63-5	25-13 63-5	25-13 63-5	25-13 63-5
24-86 63-1	24-45 62-7	24-12 62-2	23-97 61-8	23-59 61-4	23-33 61-0	22-11 60-6	22-11 60-6	22-11 60-6	22-11 60-6
21-74 60-2	21-26 59-8	20-34 59-4	20-36 59-0	20-31 58-6	20-10 58-2	20-10 57-8	20-10 57-8	20-10 57-8	20-10 57-8
20-10 57-0	19-33 56-6	19-33 56-2	18-09 55-8	18-09 55-4	17-70 55-0	17-59 55-0	17-59 55-0	17-59 55-0	17-59 55-0
17-39 54-6	17-26 54-2	16-21 53-8	16-30 53-4	16-21 53-0	15-70 52-6	15-56 52-2	15-56 52-2	15-56 52-2	15-56 52-2
15-34 51-8	15-28 51-4	14-48 51-0	14-18 50-6	14-00 50-2	13-97 49-8	13-81 49-4	13-81 49-4	13-81 49-4	13-81 49-4
13-81 49-0	12-93 48-6	12-56 47-8	12-56 47-8	12-38 47-4	12-31 47-0	12-18 46-6	12-18 46-6	12-18 46-6	12-18 46-6
11-95 46-2	11-90 45-8	11-77 45-4	11-51 45-0	11-44 44-6	11-42 44-2	11-37 43-8	11-37 43-8	11-37 43-8	11-37 43-8
1-63 43-4	1-46 43-0	10-43 42-6	10-05 42-2	9-32 41-8	9-10 41-4	8-63 41-0	8-63 41-0	8-63 41-0	8-63 41-0

APPENDIX A

6.61 40.6	8.59 40.2	8.53 39.8	4.15 39.4	8.12 39.0	7.97 38.6	7.59 38.2
7.57 37.8	7.54 37.3	7.54 36.9	7.41 36.5	7.40 36.1	7.34 35.7	7.30 35.3
6.90 34.9	6.77 34.5	6.47 34.1	6.47 33.7	5.96 33.3	5.82 32.9	5.74 32.5
5.58 32.1	5.57 31.7	5.34 31.3	5.13 30.9	5.11 30.5	5.03 30.1	5.03 29.7
5.03 29.3	4.84 28.9	4.62 28.5	4.57 28.1	4.56 27.7	4.25 27.3	4.23 26.9
4.08 26.5	4.08 26.1	4.06 25.7	4.06 25.3	4.06 24.9	4.01 24.5	4.01 24.1
3.91 23.7	3.91 23.3	3.70 22.9	3.45 22.5	3.37 22.1	3.24 21.7	3.12 21.3
2.93 20.9	2.84 20.5	2.68 20.1	2.65 19.7	2.64 19.3	2.43 18.9	2.41 18.5
2.53 18.1	2.51 17.7	2.44 17.3	2.44 16.9	2.40 16.5	2.38 16.1	2.31 15.7
2.15 15.3	2.04 14.9	1.99 14.5	1.98 14.1	1.95 13.7	1.85 13.3	1.81 12.9
1.81 12.4	1.75 12.0	1.75 11.6	1.74 11.2	1.74 10.8	1.68 10.4	1.64 10.0
1.63 9.6	1.61 9.2	1.61 8.8	1.55 8.4	1.55 8.0	1.54 7.6	1.53 7.2
1.46 6.8	1.45 6.4	1.43 6.0	1.41 5.6	1.39 5.2	1.36 4.8	1.32 4.4
1.32 4.0	1.30 3.6	1.26 3.2	1.25 2.8	1.24 2.4	1.23 2.0	1.20 1.6
1.13 1.2	1.19 0.8	1.07 0.4	1.01 0.0			
720.74447	485.31957	253.17065	273.00926	266.94238	256.67554	260.24832
169.40596	164.14902	141.15633	138.60844	137.20396	135.98967	124.27895
115.50400	114.33644	105.59581	105.59581	98.55612	95.28152	92.04651
82.51204	76.22440	75.22145	73.91707	72.80352	72.21259	72.07451
63.52034	59.32257	57.20198	57.16832	56.85927	53.97728	47.64124
45.73465	45.50157	45.06655	44.83788	43.80270	43.55679	43.48062
35.48016	33.36783	33.36781	32.85232	33.03104	29.82693	29.56880
27.44078	26.69426	26.46680	26.11394	25.75148	25.36297	25.02586
21.33541	20.53252	20.02069	19.71121	19.71120	19.54471	19.20512
18.47926	17.76008	17.24905	16.96669	15.88116	15.45090	15.39940
14.04961	13.19046	13.11916	12.99279	12.31952	11.19956	11.77870
9.10322	8.96758	5.52059	8.49121	8.44766	8.16690	7.62244
7.39171	7.16604	6.99276	6.59523	6.49328	6.14713	5.89707
5.10517	5.0517	4.92817	4.92780	4.92780	4.92780	4.80497
4.47982	4.46788	4.43165	3.67336	3.48186	3.26145	3.18421
2.70573	2.68291	2.62843	2.50259	2.46390	2.39350	2.21101
2.11192	2.00207	1.85024	1.77564	1.71012	1.64260	1.63989
1.42151	1.39744	1.30361	1.33195	1.32685	1.31087	1.26831
720.74 99.4	488.31 98.9	293.17 98.1	273.01 97.8	266.94 97.2	256.66 96.7	240.25 96.1
234.66 95.6	214.51 95.0	182.01 94.4	169.41 93.9	144.15 93.3	141.16 92.8	138.60 92.2
137.21 91.7	135.99 91.1	124.28 90.6	122.35 90.0	120.12 89.4	118.27 88.9	115.50 88.3
114.34 87.8	105.60 87.2	105.60 86.7	98.56 86.1	95.28 85.6	95.28 85.0	93.85 84.4
87.55 83.9	85.19 83.3	82.51 82.8	76.22 82.2	75.22 81.7	73.92 81.1	72.80 80.6
72.21 80.0	72.07 79.4	67.26 78.9	55.34 78.3	64.58 77.8	63.52 77.2	59.32 76.7
57.21 76.1	57.17 75.6	56.86 75.0	50.98 74.4	47.64 73.9	47.14 73.3	45.84 72.8
45.73 72.2	45.73 71.7	45.50 71.1	45.05 70.6	44.84 70.0	43.80 69.4	43.56 68.9
43.48 68.3	42.40 67.8	41.92 67.2	41.71 66.7	35.48 66.1	33.37 65.6	33.37 65.0
32.85 64.4	30.03 63.9	29.93 63.3	26.11 62.7	29.32 62.2	28.74 61.7	28.58 61.1
27.46 61.6	26.69 60.0	26.47 59.4	21.36 55.5	25.75 58.3	25.34 57.8	25.03 57.2
23.65 54.7	22.42 54.1	21.63 53.6	19.21 51.1	20.53 54.4	20.02 53.9	19.71 53.3
19.71 52.8	19.71 52.2	16.97 47.8	15.90 47.2	18.77 50.6	18.48 49.4	18.48 49.4
17.74 48.9	14.10 44.4	14.05 43.9	13.19 43.3	15.45 46.7	15.40 46.1	14.68 45.6
14.12 45.0	10.76 40.6	10.01 40.0	9.86 39.4	13.12 42.8	12.99 42.2	12.32 41.7
11.20 41.1	8.49 36.7	8.45 36.1	8.17 35.6	9.37 38.9	9.10 38.5	8.97 37.8
8.52 37.2	7.39 32.2	7.15 32.2	6.99 31.7	7.62 35.0	7.47 34.4	7.44 33.9
7.39 32.2	5.48 28.9	5.10 28.3	5.03 27.8	6.66 31.1	6.49 30.6	6.15 30.0
5.89 29.4	4.93 25.0	4.93 24.4	4.80 23.9	5.01 27.2	4.93 26.1	4.93 26.1
4.93 25.6	4.47 21.1	4.43 20.6	3.67 20.0	4.75 23.3	4.63 22.8	4.48 22.2
4.48 21.7				3.48 19.4	3.24 18.9	3.24 18.3

PARAMETERS IMMEDIATELY ABOVE VS. PER CENT CONFIDENCE LEVEL

3.18 17.8	2.84 17.2	2.79 16.7	2.71 16.1	2.46 15.6	2.63 15.0	2.50 14.4
2.46 13.9	2.39 13.3	2.21 12.8	2.19 12.2	2.18 11.7	2.15 11.1	2.11 10.6
2.00 10.0	1.85 9.4	1.78 8.9	1.71 8.3	1.64 7.8	1.64 7.2	1.64 6.7
1.53 6.1	1.45 5.6	1.42 5.0	1.41 4.4	1.38 3.9	1.33 3.3	1.33 2.8
1.31 2.2	1.27 1.7	1.21 1.1	1.08 0.6	1.01 0.0		
791.89551	343.02197	158.40302	85.54433	69.99080	57.17033	44.00081
41.92491	40.01923	33.53993	32.99565	29.59406	25.15494	22.95349
21.12139	2.30186	18.48035	17.59767	12.93087	11.17998	10.06198
8.38498	6.11673	6.03440	5.73838	5.01200	4.44640	4.30378
3.77093	3.49366	3.03070	2.96961	2.95940	2.69517	2.51549
2.35828	2.35683	2.12019	2.09369	1.83654	1.81731	1.82465
1.68503	1.45125	1.41433	1.38886	1.32002	1.07321	1.06438
PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL						
791.90 98.6	343.02 97.1	158.40 95.7	85.54 94.2	69.99 92.8	57.17 91.3	44.00 89.9
57.17 88.4	44.00 87.0	42.24 85.5	41.92 84.1	40.02 82.6	33.54 81.2	33.00 79.7
33.00 78.3	29.59 76.8	26.40 75.4	25.15 73.9	22.95 72.5	22.95 71.0	21.32 69.6
20.31 68.1	18.48 66.7	17.60 65.2	14.72 63.8	12.93 62.3	12.49 60.9	11.18 59.4
10.06 58.1	8.88 56.5	8.38 55.1	8.12 53.6	6.03 52.2	5.74 50.7	5.66 49.3
5.01 47.8	4.80 46.4	4.45 44.9	4.30 43.5	4.04 42.0	3.77 40.6	3.49 39.1
3.03 37.7	2.97 36.2	2.97 34.8	2.96 33.3	2.95 31.9	2.70 30.4	2.52 29.0
2.45 27.5	2.36 26.1	2.36 24.6	2.32 23.2	2.19 21.7	1.95 20.3	1.84 18.8
1.83 17.4	1.82 15.9	1.62 14.5	1.52 13.0	1.49 11.6	1.45 10.1	1.41 8.7
1.39 7.2	1.35 5.8	1.32 4.3	1.12 2.9	1.07 1.4	1.06 0.0	
727.52051	216.25616	143.93538	82.67279	78.59019	63.42088	51.12602
49.87612	47.36977	41.18041	36.91898	37.99892	31.66577	30.31335
28.41876	28.04044	26.38814	25.56302	23.09212	21.08754	19.55699
19.77151	19.62692	17.62967	17.59209	16.79245	15.83289	15.14847
12.66631	12.27025	10.55526	10.51517	9.19297	8.52101	8.11943
7.90764	7.86338	7.82380	7.69997	6.81681	6.55462	6.39076
5.96471	5.92122	5.68375	5.27763	5.13437	4.73942	4.69123
4.44596	4.39851	4.32888	4.27916	4.22210	4.00081	3.72538
3.66761	3.59838	3.40840	3.32512	3.03133	2.93392	2.72820
2.55631	2.55631	2.48691	2.48359	2.34714	2.11139	2.06919
2.03419	1.97911	1.94766	1.76035	1.70420	1.68701	1.64944
1.64847	1.64261	1.64215	1.54514	1.51567	1.43512	1.37372
1.29190	1.24179	1.24179	1.22109	1.18329	1.11458	1.05553
1.01877	1.01055					
PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL						
727.52 99.2	216.26 98.5	143.94 97.7	82.67 97.0	78.59 95.5	63.42 94.7	51.12 94.7
63.42 93.9	51.13 93.2	50.89 92.4	49.88 91.7	47.37 90.9	41.18 90.2	38.92 89.4
38.14 88.6	38.00 87.9	36.52 87.1	31.67 86.4	31.31 85.6	29.78 84.8	28.42 84.1
28.04 83.3	26.39 82.6	25.56 81.8	25.15 81.1	23.09 80.3	21.44 79.5	21.09 78.8
21.97 78.1	19.56 77.3	19.07 76.5	18.63 75.8	17.63 75.0	17.32 74.2	17.32 73.5
16.79 72.7	16.02 72.0	15.03 71.2	15.15 70.5	13.26 69.7	12.67 68.9	12.27 68.2
13.56 67.4	12.52 66.7	10.10 65.9	9.19 65.2	9.09 64.4	8.52 63.6	8.12 62.9
7.98 62.1	7.91 61.4	7.86 60.6	7.82 59.6	7.70 59.1	6.82 58.3	6.82 57.6
6.62 56.8	6.55 56.1	6.47 55.3	6.39 54.5	5.96 53.8	5.92 53.0	5.68 52.3
5.28 51.5	5.27 50.8	5.20 50.0	5.13 49.2	5.05 48.5	4.74 47.7	4.69 47.0
4.45 46.2	4.47 45.5	4.35 44.7	4.28 43.9	4.23 43.2	4.22 42.4	4.11 41.7
4.00 40.9	3.95 40.2	3.73 39.4	3.67 38.6	3.60 37.9	3.41 37.1	3.33 36.4

APPENDIX A

3-21 35.6	3-07 34.8	2-99 34.1	2-93 33.5	2-81 32.6	2-73 31.8	2-56 31.1
2-56 30.3	2-49 29.5	2-48 28.8	2-35 28.0	2-26 27.3	2-17 26.5	2-11 25.8
2-09 25.0	2-07 24.2	2-03 23.5	1-98 22.7	1-96 22.0	1-76 21.2	1-70 20.5
1-77 19.7	1-71 18.9	1-69 18.2	1-68 17.4	1-65 16.7	1-65 15.9	1-64 15.2
1-64 14.4	1-55 13.6	1-54 12.9	1-52 12.1	1-46 11.4	1-44 10.6	1-37 9.8
1-32 9.1	1-29 8.3	1-24 7.6	1-24 6.8	1-22 6.1	1-17 5.3	1-37 9.8
1-13 3.8	1-11 3.0	1-06 2.3	1-05 1.5	1-02 0.8	1-01 0.0	1-16 4.5

237-23941	90-28205	89-86336	87-86639	69-26862	59-62102	58-34615	55-49240	45-59254	44-76213
32.63686	30.89053	27.03070	25.79674	22.52560	21.25810	21.24437	20.10803	19.772691	19.772691
18-82851	15-90043	15.53787	14.20895	14.07564	13.98406	13.51536	10.98330	10.81229	9.88497
7-07073	9.67378	9.35232	9.32462	9.21174	8.60734	8.59563	8.34112	7.45970	7.26594
7-02931	6.83655	6.83095	6.75630	6.6045	6.17811	5.32836	4.83265	4.50512	4.04655
3-98250	3.75789	3.75350	3.75350	3.65280	3.51891	3.50912	3.29699	3.19701	3.07167
3-05963	2.91335	2.67344	2.13134	2.12006	1.96358	1.93114	1.93077	1.87675	1.68942
1-64749	1.62215	1.60928	1.51746	1.51343	1.47756	1.47756	1.30570	1.21396	1.17537
1-14608	1.10563	1.07020	1.06695	1.06567	1.06567	1.06003			

PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL									
237-24 98.9	90-58 97.7	89-66 96.6	87-87 95.4	69-27 94.3	59-62 93.1	58-35 92.0			
55-49 90.8	45-59 89.7	44-76 88.5	34-63 87.4	32-44 86.2	30-89 85.1	27-03 83.9			
25-80 82.8	22-53 81.6	21-26 80.5	21-04 79.3	20-11 78.2	19-73 77.0	18-83 75.9			
15-90 74.7	15-54 73.6	14-21 72.4	14-08 71.3	13-98 70.1	13-52 69.0	10-98 67.8			
10-81 66.7	9-88 65.5	9-71 64.4	9-67 63.2	9-35 62.1	9-32 60.9	9-21 59.8			
8-61 58.6	8-61 57.5	8-34 56.3	7-46 55.2	7-27 54.0	7-03 52.9	6-94 51.7			
6-93 50.6	6-76 49.4	6-66 48.3	6-18 47.1	5-23 46.0	4-93 44.8	4-51 43.7			
4-05 42.5	3-98 41.4	3-76 40.2	3-75 39.1	3-75 37.9	3-65 36.8	3-52 35.6			
3-51 34.5	3-29 33.3	3-20 32.2	3-07 31.0	3-06 29.9	2-91 28.7	2-47 27.6			
2-13 26.4	2-12 25.3	1-96 24.1	1-93 23.0	1-93 21.8	1-88 20.7	1-69 19.5			
1-65 18.6	1-62 17.2	1-61 16.1	1-52 14.9	1-51 13.8	1-41 12.6	1-41 11.5			
1-31 15.3	1-21 9.2	1-18 8.0	1-15 6.9	1-11 5.7	1-07 4.6	1-07 3.4			
1-07 2.3	1-07 1.1	1-06 0.0							

482-32471	225-57544	140-15343	52-10298	42-62971	37-57031	26-31712	24-18864	23-35890	20-09886
18-99904	16-68712	17.98838	16.54218	16.35123	13.98043	13.98043	9.17362	7.35209	6.61888
5-83862	5-23918	3.93413	3.49511	3.44518	3.35347	3.22408	2.80421	2-62133	2-32209
2-12790	1-86414	1.80072	1.77238	1.65422	1.62497	1.61716	1.55083	1.43949	1.36763
1-31394	1-28345	1.21296	1.16794	1.04783					

PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL									
482-32 97.8	225-58 95.6	140-15 93.3	52-10 91.1	42-63 88.9	37-57 86.7	26-32 84.4			
24-17 82.2	23-36 80.0	20-10 77.8	19-00 75.6	18-69 73.3	17-97 71.1	16-54 68.9			
16-35 66.7	13-98 64.4	13-98 62.2	9-17 60.0	7-35 57.8	6-62 55.6	5-84 53.3			
5-34 51.1	3-93 48.9	3-50 46.7	3-45 44.4	3-35 42.2	3-22 40.0	2-80 37.8			
2-82 35.6	2-32 33.3	2-13 31.1	1-95 28.9	1-81 26.7	1-77 24.4	1-65 22.2			
1-62 20.0	1-62 17.8	1-55 15.6	1-44 13.3	1-35 11.1	1-31 8.9	1-28 6.7			
1-21 4.4	1-17 2.2	1-05 0.0							

365-37231	351-51854	351-46631	196-52527	184-76741	184-14784	172-94226	169-22473	164-41772	164-41762
154-41275	153-45657	148-59133	137-07204	131-01691	128-47520	121-94649	115-09236	114-22668	99-77437

91.38132	90.17692	88.53259	88.07243	86.57178	86.47110	83.14532	80.63056	79.37402	78.32684
76.15112	73.39224	71.37506	68.53600	67.70139	67.55556	61.32704	57.11331	54.82880	53.75371
52.21790	51.28266	51.15213	50.25974	46.48984	46.03694	39.46024	33.76042	32.89726	31.97011
30.67206	30.51921	30.02469	27.62216	26.67963	24.75104	24.01974	19.21581	15.37265	14.41186
11.83666	1.94316	10.75074	1.111359	9.71422	9.13814	8.52536	7.82942	7.67282	7.67282
7.36946	7.56128	6.55084	5.31287	4.42344	4.22573	3.86229	3.83641	3.72680	3.60296
3.60296	3.54753	3.15108	3.06478	2.62590	2.55761	1.80148	1.74080	1.52456	1.44591
1.44118	1.36789	1.22765	1.18830	1.17349	1.14039	1.10569	1.10208	1.09612	
PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL									
365.37 99.0	351.51 98.0	351.47 97.0	196.53 96.0	184.77 94.9	184.77 94.9	172.94 92.9	184.15 93.9	172.94 92.9	
169.22 91.9	164.42 90.9	164.42 89.9	154.41 88.9	153.46 87.9	153.46 87.9	148.99 86.9	148.99 86.9	137.07 85.9	
131.02 84.8	128.48 83.8	121.95 82.8	115.09 81.8	114.23 80.8	114.23 80.8	99.77 79.8	99.77 79.8	91.38 78.8	
9.118 77.8	88.53 76.8	88.07 75.8	86.57 74.7	86.47 73.7	86.47 73.7	83.15 72.7	83.15 72.7	80.63 71.7	
79.37 70.7	78.33 69.7	76.15 68.7	73.39 67.7	71.38 66.7	71.38 66.7	68.54 65.7	68.54 65.7	67.70 64.7	
67.56 63.6	61.33 62.6	57.11 61.6	54.83 60.6	53.75 59.6	53.75 59.6	52.22 58.6	52.22 58.6	51.88 57.6	
51.15 56.6	50.28 55.6	46.49 54.5	46.04 53.5	39.46 52.5	39.46 52.5	33.76 51.5	33.76 51.5	32.90 50.5	
31.97 49.5	30.87 48.5	30.52 47.5	30.02 46.5	27.62 45.5	27.62 45.5	26.88 44.4	26.88 44.4	24.75 43.4	
24.62 42.4	19.22 41.4	15.37 40.4	14.41 39.4	11.84 38.4	11.84 38.4	10.94 37.4	10.94 37.4	10.75 36.4	
12.11 35.4	9.71 34.3	9.14 33.3	8.53 32.3	7.83 31.3	7.83 31.3	7.67 30.3	7.67 30.3	7.67 29.3	
7.57 28.3	7.56 27.3	6.55 26.3	5.31 25.3	4.62 24.2	4.62 24.2	4.24 23.2	4.24 23.2	3.86 22.2	
3.84 21.2	3.73 20.2	3.60 19.2	3.60 18.2	3.55 17.2	3.55 17.2	3.15 16.2	3.15 16.2	3.04 15.2	
2.63 14.1	2.56 13.1	1.80 12.1	1.74 11.1	1.53 10.1	1.53 10.1	1.45 9.1	1.45 9.1	1.44 8.1	
1.37 7.1	1.23 6.1	1.19 5.1	1.17 4.0	1.14 3.0	1.14 3.0	1.11 2.0	1.11 2.0	1.10 1.0	
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APPENDIX A

24.78 72.8	23.93 71.6	23.84 71.4	23.07 69.1	22.16 67.9	20.86 66.7	19.31 65.4
18.77 64.2	18.05 63.0	16.83 61.7	16.37 60.5	15.96 59.3	12.94 58.0	12.87 56.8
12.87 55.6	12.30 54.3	11.82 53.1	11.43 51.9	10.88 50.6	10.73 49.4	10.73 48.1
10.73 46.9	10.06 45.7	8.38 44.4	6.91 43.2	6.84 42.0	6.70 40.7	6.26 39.5
6.11 38.3	5.98 37.1	5.91 35.8	5.36 34.6	5.28 33.3	4.97 32.1	4.89 30.9
4.60 29.6	4.28 28.4	4.27 27.2	4.05 25.9	4.02 24.7	4.02 23.5	3.98 22.2
3.75 21.0	3.49 19.8	3.01 18.5	2.71 17.3	2.68 16.0	2.64 14.8	2.60 13.8
2.58 12.3	2.54 11.1	2.44 9.9	2.43 8.6	2.34 7.4	1.80 6.2	1.43 4.9
1.31 3.7	1.15 2.5	1.08 1.2	1.07 0.0			
117.07997	95.79268	55.41107	33.08063	31.41522	23.15643	7.74161
5.57148	4.78158	4.08435	3.32467	3.11687	2.29020	1.90850
1.65603						5.89036
1.65603						1.86078
PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL						
117.08 95.2	95.79 91.5	55.41 85.7	52.89 81.0	33.08 76.2	31.42 71.4	23.16 66.7
13.30 61.9	7.74 57.1	5.89 52.4	5.57 47.6	4.78 42.9	4.06 38.1	3.56 33.3
3.32 28.6	3.12 23.8	2.58 19.0	2.29 14.3	1.91 9.5	1.86 4.8	1.65 0.0
72.93898	64.17728	62.10643	20.29842	18.33365	14.49531	12.86336
9.484.8	6.97798	6.85100	4.91164	4.82205	3.61499	3.57206
3.27550	3.21413	2.91199	2.35117	1.96828	1.63581	1.52161
1.27609	1.21057	1.01869				
PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL						
72.94 97.1	64.18 93.9	62.10 90.9	51.07 87.9	20.30 84.8	18.33 81.8	14.71 78.8
14.50 75.8	12.84 72.7	10.09 69.7	9.28 66.7	6.98 63.6	6.85 60.6	6.42 57.6
4.91 54.5	4.82 51.5	3.81 48.5	3.61 45.5	3.57 42.4	3.36 39.4	3.28 36.4
3.21 33.3	2.91 30.3	2.74 27.3	2.35 24.2	1.97 21.2	1.75 18.2	1.64 15.2
1.52 12.1	1.43 9.1	1.28 6.1	1.21 3.0	1.02 0.0		
1293.02979	408.92798	129.32578	29.24849	23.12093	21.35901	19.49556
18.90089	16.75563	16.39331	13.23296	11.59400	10.25745	8.91684
8.35334	8.35187	7.39658	7.00381	6.73626	6.65792	5.92027
5.55653	5.47421	5.29937	4.98601	4.91271	4.88527	4.38727
3.67078	3.30155	3.18402	2.82383	2.42220	2.39030	2.30324
2.27864	2.22286	2.17827	1.93198	1.87199	1.77979	1.77867
1.67586	1.57619	1.40435	1.39806	1.39781	1.35731	1.33177
1.12968	1.12948	1.12877	1.10670	1.10650	1.04891	1.00018
1.00000						
PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL						
1293.03 98.8	408.93 97.5	129.33 96.3	34.78 95.1	29.25 93.8	23.12 92.6	21.36 91.4
2.62 91.1	19.51 88.9	19.18 87.7	18.90 86.4	16.76 85.2	16.09 84.0	14.14 82.7
13.23 81.5	11.59 80.2	10.26 79.0	9.26 77.8	8.92 76.5	8.36 75.3	8.35 74.1
6.35 72.8	7.41 71.6	7.35 70.4	7.00 69.1	6.74 67.9	6.66 66.7	6.21 65.4
5.92 64.2	5.81 63.0	5.56 61.7	5.47 60.5	5.30 59.3	5.29 58.0	4.99 56.8
4.91 55.6	4.69 54.3	4.63 53.1	4.39 51.9	4.13 50.6	3.67 49.4	3.30 48.1
3.18 46.9	2.82 45.7	2.54 44.4	2.42 43.2	2.39 42.0	2.37 40.7	2.30 39.5
2.29 36.3	2.28 37.0	2.21 35.8	2.04 34.6	1.93 32.1	1.87 30.9	1.87 30.9
1.78 24.6	1.74 28.4	1.78 27.2	1.69 25.9	1.68 24.7	1.58 23.5	1.40 22.2

1.40 21.0	1.40 19.8	1.40 18.5	1.40 17.3	1.36 16.0	1.33 14.8	1.14 13.6
1.13 12.3	1.13 11.1	1.13 9.9	1.11 8.6	1.11 7.4	1.11 6.2	1.05 4.9
1.04 3.7	1.00 2.5	1.00 1.2	1.00 0.0			
1293.02979	408.92798	129.32578	34.77586	29.24849	23.12093	21.35901
18.90089	16.33365	16.75563	16.09331	14.49531	14.14206	13.23296
10.08529	9.28408	9.26303	8.91684	8.35863	8.35334	8.35187
6.85100	6.73626	6.65792	6.27581	5.92027	5.81498	5.55653
4.96601	4.91271	4.85527	4.63233	4.38727	4.32261	3.87078
3.27550	3.18472	2.82383	2.74416	2.54465	2.42227	2.39130
2.29408	2.27664	2.20286	2.17827	2.04197	1.96828	1.93198
1.77867	1.68941	1.57586	1.57619	1.52161	1.42916	1.40435
1.39693	1.35731	1.33177	1.21057	1.13986	1.12968	1.12948
1.10657	1.04891	1.03539	1.00018			
1293.03 99.	4.12.93 97.9	129.33 96.9	34.78 95.8	29.25 94.8	23.12 93.8	21.36 92.7
20.62 91.7	19.50 90.6	19.08 89.6	18.90 88.5	18.33 87.5	16.76 86.5	16.09 85.4
14.50 84.4	14.14 83.3	13.23 82.3	12.84 81.3	11.59 80.2	10.24 79.2	10.09 78.1
9.28 77.1	9.26 76.0	8.92 75.0	8.36 74.0	8.35 72.9	8.35 71.9	7.40 70.8
7.35 69.8	7.31 68.8	6.85 67.7	6.74 66.7	6.66 65.6	6.21 64.6	5.92 63.5
5.81 62.5	5.56 61.5	5.47 60.4	5.30 59.4	5.29 58.3	4.99 57.3	4.91 56.3
4.69 55.2	4.63 54.2	4.39 53.1	4.13 52.1	3.67 51.0	3.61 50.0	3.57 49.0
3.50 47.9	3.28 46.9	3.18 45.8	2.82 44.8	2.74 43.8	2.54 42.7	2.42 41.7
2.39 40.6	2.37 39.6	2.35 38.5	2.30 37.5	2.29 36.5	2.28 35.4	2.20 34.4
2.18 33.3	2.04 32.3	1.97 31.3	1.93 30.2	1.87 29.2	1.78 28.1	1.78 27.1
1.78 26.1	1.69 25.1	1.68 24.0	1.58 22.9	1.52 21.9	1.43 20.8	1.40 19.8
1.40 18.8	1.40 17.7	1.40 16.7	1.40 15.6	1.36 14.6	1.33 13.5	1.21 12.5
1.14 11.5	1.13 10.4	1.13 9.4	1.13 8.3	1.11 7.3	1.11 6.3	1.11 5.2
1.05 4.2	1.04 3.1	1.00 2.1	1.00 1.0	1.00 0.0		
PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL						
337.38477	337.38013	267.27881	190.15332	154.32246	152.59288	122.91597
57.04596	53.24290	49.84566	45.81412	45.81412	44.36916	43.82220
40.12386	39.93217	37.14621	37.14621	33.59702	33.59702	33.59702
27.53206	26.74922	26.62144	25.29985	25.07741	25.07741	23.60226
22.43144	22.29132	22.29102	22.29102	21.44490	21.11781	20.47803
20.06192	19.38289	19.10658	19.01718	18.86195	18.35471	17.74763
15.97289	15.74861	14.38456	13.91037	13.38592	13.37462	13.31073
12.26338	11.71989	11.58208	11.40920	11.40920	10.83775	10.64858
9.98334	9.47425	9.17736	9.16282	9.11906	8.87382	8.76486
8.39926	8.35914	8.29927	8.29927	8.15436	8.15436	8.02477
7.98644	7.98644	7.72139	7.71613	7.57054	7.54479	7.46601
6.74255	6.71535	6.68731	6.64741	6.60770	6.60770	6.47813
6.31751	6.29944	6.29944	6.23568	6.23071	6.14760	5.92889
5.57276	5.53284	5.42214	5.32429	5.32429	5.27666	5.23379
5.14478	5.11548	5.01548	4.99152	4.94983	4.88192	4.84026
4.71978	4.58141	4.38222	4.38222	4.38222	4.19461	4.14963
3.95233	3.93346	3.80112	3.83734	3.80756	3.80306	3.77239
3.60838	3.60838	3.56249	3.37331	3.35970	3.25746	3.17488
3.02677	3.1375	3.03869	2.97825	2.97214	2.94249	2.87974
2.74151	2.54142	2.51978	2.50774	2.50774	2.42142	2.39979
2.35959	2.35959	2.35959	2.3142	2.28184	2.28184	2.28184
1.98430	1.96890	1.95726	1.92444	1.87818	1.78328	1.71832
60.79372	60.79372	40.12386	40.12386	32.59769	32.59769	27.53943
23.48952	23.48952	20.06192	20.06192	16.03673	16.03673	12.73774
10.07911	10.07911	8.72258	8.72258	7.98644	7.98644	6.47813
6.47813	6.47813	5.92889	5.92889	5.23379	5.21194	5.14551
4.71978	4.71978	4.38222	4.38222	4.14963	4.12981	3.99322
3.61478	3.61478	3.37331	3.37331	3.17488	3.13031	3.04605
2.76642	2.76642	2.51978	2.51978	2.39979	2.37155	2.36023
2.01582	2.01582	1.87818	1.87818	1.78328	1.68690	1.61266

APPENDIX A

PARAMETERS IMMEDIATELY ABOVE 5% PER CENT CONFIDENCE LEVEL	1.61225	1.60467	1.59729	1.57348	1.57326	1.54322	1.53585	1.50255	1.45208	1.44552
330.38 99.6	1.43997	1.43299	1.40128	1.38894	1.38358	1.37733	1.34388	1.33107	1.32868	1.32868
100.79 96.8	1.18011	1.18011	1.10128	1.08414	1.08377	1.06576	1.06430	1.00170	1.00170	1.00170
45.01 94.0	307.38 99.2	307.38 99.2	267.28 98.8	190.15 98.4	154.32 98.0	152.59 97.6	152.59 97.6	152.59 97.6	152.59 97.6	152.59 97.6
39.93 91.2	83.99 96.4	60.79 96.0	53.24 95.2	43.82 93.2	40.12 92.4	33.60 89.6	33.60 89.6	33.60 89.6	33.60 89.6	33.60 89.6
32.60 88.4	44.37 93.6	37.15 90.4	33.60 90.0	26.75 87.1	26.62 86.7	22.43 83.5	22.43 83.5	22.43 83.5	22.43 83.5	22.43 83.5
25.08 85.5	27.34 88.4	23.60 85.1	23.60 84.3	21.12 81.5	20.48 81.1	18.86 77.9	18.86 77.9	18.86 77.9	18.86 77.9	18.86 77.9
22.29 82.7	22.29 82.7	21.44 81.9	19.11 78.7	16.04 75.9	15.97 75.5	15.75 75.1	15.75 75.1	15.75 75.1	15.75 75.1	15.75 75.1
20.06 79.9	20.06 79.9	19.38 78.1	16.28 76.3	13.31 73.1	12.88 72.7	12.74 71.9	12.74 71.9	12.74 71.9	12.74 71.9	12.74 71.9
17.75 77.1	17.75 77.1	16.28 76.3	13.31 73.1	11.41 71.3	11.41 69.9	10.84 69.5	10.84 69.5	10.84 69.5	10.84 69.5	10.84 69.5
12.26 71.5	11.72 71.1	11.58 70.7	10.08 67.9	9.98 67.5	9.48 67.1	9.16 66.7	9.16 66.7	9.16 66.7	9.16 66.7	9.16 66.7
10.65 68.7	10.08 68.3	10.08 67.9	8.76 65.1	8.76 64.7	8.72 64.3	8.41 63.9	8.41 63.9	8.41 63.9	8.41 63.9	8.41 63.9
9.12 65.9	8.87 65.5	8.30 62.7	8.15 61.8	8.15 61.4	8.15 61.4	8.02 61.0	8.02 61.0	8.02 61.0	8.02 61.0	8.02 61.0
8.36 63.1	8.30 62.7	7.99 59.4	7.99 59.4	7.99 59.4	7.99 59.4	7.72 58.6	7.72 58.6	7.72 58.6	7.72 58.6	7.72 58.6
7.99 60.2	7.99 59.4	7.45 56.6	7.45 56.6	7.45 56.6	7.45 56.6	6.95 55.8	6.95 55.8	6.95 55.8	6.95 55.8	6.95 55.8
7.34 57.4	7.47 57.0	6.65 54.2	6.65 54.2	6.65 54.2	6.65 54.2	6.48 53.0	6.48 53.0	6.48 53.0	6.48 53.0	6.48 53.0
6.69 54.6	6.32 51.4	6.30 51.0	6.30 51.0	6.30 51.0	6.30 51.0	6.24 50.2	6.24 50.2	6.24 50.2	6.24 50.2	6.24 50.2
6.32 51.8	6.32 51.4	5.73 48.2	5.73 48.2	5.73 48.2	5.73 48.2	5.57 47.4	5.57 47.4	5.57 47.4	5.57 47.4	5.57 47.4
5.93 49.0	5.76 48.6	5.28 45.4	5.28 45.4	5.28 45.4	5.28 45.4	5.21 44.6	5.21 44.6	5.21 44.6	5.21 44.6	5.21 44.6
5.32 46.2	5.32 46.2	5.02 43.0	5.02 42.6	5.02 42.6	5.02 42.6	4.95 41.8	4.95 41.8	4.95 41.8	4.95 41.8	4.95 41.8
5.14 43.4	5.02 43.0	4.72 39.8	4.72 39.8	4.72 39.8	4.72 39.8	4.58 39.0	4.58 39.0	4.58 39.0	4.58 39.0	4.58 39.0
4.80 40.6	4.72 40.2	4.15 36.9	4.15 36.9	4.15 36.9	4.15 36.9	4.01 36.1	4.01 36.1	4.01 36.1	4.01 36.1	4.01 36.1
4.38 37.8	4.19 37.3	3.84 34.5	3.84 34.1	3.84 34.1	3.84 34.1	3.80 33.3	3.80 33.3	3.80 33.3	3.80 33.3	3.80 33.3
3.93 34.9	3.86 34.5	3.61 31.7	3.61 31.3	3.61 31.3	3.61 31.3	3.58 30.5	3.58 30.5	3.58 30.5	3.58 30.5	3.58 30.5
3.63 32.1	3.61 31.7	3.13 28.5	3.13 28.5	3.13 28.5	3.13 28.5	3.05 27.7	3.05 27.7	3.05 27.7	3.05 27.7	3.05 27.7
3.26 29.3	3.17 28.9	2.97 25.7	2.97 25.7	2.97 25.7	2.97 25.7	2.88 24.9	2.88 24.9	2.88 24.9	2.88 24.9	2.88 24.9
3.01 26.5	2.98 26.1	2.54 22.9	2.54 22.9	2.54 22.9	2.54 22.9	2.51 22.1	2.51 22.1	2.51 22.1	2.51 22.1	2.51 22.1
2.77 23.7	2.74 23.3	2.37 20.1	2.37 20.1	2.37 20.1	2.37 20.1	2.36 19.3	2.36 19.3	2.36 19.3	2.36 19.3	2.36 19.3
2.40 20.9	2.40 20.5	2.28 17.7	2.28 17.7	2.28 17.7	2.28 17.7	2.08 16.5	2.08 16.5	2.08 16.5	2.08 16.5	2.08 16.5
2.32 18.1	2.28 17.7	1.96 14.5	1.96 14.5	1.96 14.5	1.96 14.5	1.88 13.7	1.88 13.7	1.88 13.7	1.88 13.7	1.88 13.7
1.98 15.3	1.97 14.9	1.61 11.6	1.61 11.6	1.61 11.6	1.61 11.6	1.60 10.8	1.60 10.8	1.60 10.8	1.60 10.8	1.60 10.8
1.69 12.4	1.65 12.0	1.54 9.2	1.54 8.8	1.54 8.8	1.54 8.8	1.45 8.0	1.45 8.0	1.45 8.0	1.45 8.0	1.45 8.0
1.57 9.6	1.54 9.2	1.39 6.4	1.39 6.0	1.39 6.0	1.39 6.0	1.38 5.6	1.38 5.6	1.38 5.6	1.38 5.6	1.38 5.6
1.43 6.8	1.39 6.4	1.23 3.6	1.23 3.2	1.23 3.2	1.23 3.2	1.10 2.4	1.10 2.4	1.10 2.4	1.10 2.4	1.10 2.4
1.07 1.2	1.06 0.8	1.00 0.4	1.00 0.4	1.00 0.4	1.00 0.4	1.00 0.0	1.00 0.0	1.00 0.0	1.00 0.0	1.00 0.0

4.85853	4.83983	4.76676	4.74811	4.71937	4.71937	4.71853	4.56247	4.54167	4.54167
4.50908	4.40396	4.23861	4.19572	4.19498	4.19233	4.15827	4.12944	4.00715	3.99286
3.99216	3.93585	3.93515	3.93267	3.86883	3.86273	3.86206	3.80206	3.75733	3.74087
3.66997	3.62988	3.60727	3.58195	3.50297	3.49373	3.45636	3.45636	3.45636	3.45636
3.02704	3.02513	3.01348	2.97069	2.94275	2.93796	2.93796	2.93796	2.93796	2.93796
2.54075	2.54075	2.54075	2.54075	2.54075	2.54075	2.54075	2.54075	2.54075	2.54075
2.24452	2.24452	2.24452	2.24452	2.24452	2.24452	2.24452	2.24452	2.24452	2.24452
1.74144	1.74144	1.74144	1.74144	1.74144	1.74144	1.74144	1.74144	1.74144	1.74144
1.48534	1.48534	1.48534	1.48534	1.48534	1.48534	1.48534	1.48534	1.48534	1.48534
1.16096	1.16096	1.16096	1.16096	1.16096	1.16096	1.16096	1.16096	1.16096	1.16096
423.46	386.88	330.36	330.36	194.74	194.74	194.74	194.74	194.74	194.74
133.07	96.21	76.52	76.52	72.58	72.58	72.58	72.58	72.58	72.58
57.04	53.24	53.23	53.23	53.23	53.23	53.23	53.23	53.23	53.23
50.50	44.37	39.93	39.93	39.93	39.93	39.93	39.93	39.93	39.93
33.67	33.04	32.59	32.59	31.94	31.94	31.94	31.94	31.94	31.94
30.71	30.13	29.71	29.71	29.71	29.71	29.71	29.71	29.71	29.71
28.06	28.06	27.54	27.54	27.54	27.54	27.54	27.54	27.54	27.54
25.41	25.41	25.25	25.25	24.95	24.95	24.95	24.95	24.95	24.95
20.48	20.48	20.21	20.21	18.57	18.57	18.57	18.57	18.57	18.57
17.17	16.65	16.83	16.83	16.28	16.28	16.28	16.28	16.28	16.28
15.97	15.97	15.01	15.01	14.52	14.52	14.52	14.52	14.52	14.52
13.31	12.88	12.23	12.23	11.83	11.83	11.83	11.83	11.83	11.83
11.41	11.41	11.01	11.01	10.98	10.98	10.98	10.98	10.98	10.98
10.45	10.45	10.10	10.10	10.01	10.01	10.01	10.01	10.01	10.01
9.98	9.98	9.53	9.53	9.50	9.50	9.50	9.50	9.50	9.50
8.87	8.87	8.78	8.78	8.77	8.77	8.77	8.77	8.77	8.77
7.99	7.99	7.99	7.99	7.99	7.99	7.99	7.99	7.99	7.99
7.21	7.21	7.11	7.11	6.94	6.94	6.94	6.94	6.94	6.94
6.74	6.74	6.61	6.61	6.47	6.47	6.47	6.47	6.47	6.47
6.14	6.14	5.94	5.94	5.82	5.82	5.82	5.82	5.82	5.82
5.16	5.16	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15
4.99	4.99	4.97	4.97	4.96	4.96	4.96	4.96	4.96	4.96
4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72
4.43	4.43	4.42	4.42	4.41	4.41	4.41	4.41	4.41	4.41
4.01	4.01	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99
3.82	3.82	3.82	3.82	3.81	3.81	3.81	3.81	3.81	3.81
3.61	3.61	3.61	3.61	3.60	3.60	3.60	3.60	3.60	3.60
3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43
2.75	2.75	2.71	2.71	2.55	2.55	2.55	2.55	2.55	2.55
2.42	2.42	2.42	2.42	2.36	2.36	2.36	2.36	2.36	2.36
2.24	2.24	2.18	2.18	2.13	2.13	2.13	2.13	2.13	2.13
1.92	1.92	1.88	1.88	1.87	1.87	1.87	1.87	1.87	1.87
1.98	1.98	1.97	1.97	1.96	1.96	1.96	1.96	1.96	1.96
1.45	1.45	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23
1.06	1.06	1.02	1.02	1.00	1.00	1.00	1.00	1.00	1.00

PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL

371.09106	345.25195	300.20972	197.19920	160.04368	147.14079	127.47346	106.52576	59.15971	49.06470
47.51169	47.51169	41.61057	41.61057	41.61057	41.61057	41.61057	41.61057	41.61057	41.61057
34.84190	30.92426	28.55986	27.60786	26.00661	26.00661	26.00661	26.00661	26.00661	26.00661
24.35988	23.11697	22.23952	21.90030	21.13593	20.90314	20.90314	20.90314	20.90314	20.90314
19.81456	19.72183	19.51364	18.40524	18.01259	16.56471	16.33214	16.13438	15.69601	15.03318
13.87019	13.80394	13.77834	13.20971	13.00910	12.38450	11.83195	11.83195	11.83195	11.83195
11.04315	10.44381	10.45258	10.45258	10.35295	9.50234	9.45495	9.32181	9.32181	9.32181
9.008921	9.04578	8.71048	8.66887	8.47437	8.45170	8.36299	8.32211	8.28236	8.28236

APPENDIX A

7.42182
6.14857
5.52157
4.89536
4.14118
3.48419
3.01846
2.45311
1.65447
1.22384

7.46613
6.40990
5.55167
5.04679
4.33572
3.50318
3.06145
2.45311
1.67241
1.22384

7.57329
6.53286
5.62305
5.08813
4.33572
3.45881
3.08226
2.48871
1.76710
1.23697

7.74265
6.53286
5.76283
5.21332
4.54460
3.76471
3.12542
2.61314
1.77162
1.39388

7.80546
6.90504
5.76283
5.21332
4.54460
3.76471
3.12542
2.61314
1.77162
1.39388

7.85105
6.93509
5.77925
5.20132
4.58108
3.94398
3.21826
2.65465
1.91340
1.44886

8.00203
7.09587
5.80699
5.30130
4.63864
4.04474
3.34520
2.85065
1.99575
1.50185

8.28236
7.25988
5.94437
5.30130
4.63864
4.05296
3.36990
2.85065
2.25580
1.50588

8.28236
7.25988
5.94437
5.30130
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4.05296
3.36990
2.85065
2.25580
1.50588

PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL

371.09 99.5	345.25 98.9	300.02 98.4	197.20 97.8	160.04 97.3	147.14 96.7	127.47 96.2
104.53 95.6	59.16 95.1	48.06 94.5	47.51 94.0	47.51 93.4	41.61 92.9	41.61 92.3
41.61 91.8	41.41 91.3	38.52 90.7	38.52 90.2	37.11 89.6	34.84 89.1	34.84 88.5
30.92 88.0	28.56 87.4	27.61 86.9	26.01 86.3	26.01 85.8	25.19 85.2	24.48 84.7
24.48 84.2	24.40 83.6	24.36 83.1	23.12 82.5	22.24 82.0	21.90 81.4	21.19 80.9
20.91 80.3	20.91 79.8	20.81 79.2	20.62 78.7	20.10 78.1	19.81 77.6	19.72 77.0
19.51 76.5	18.61 76.0	18.01 75.4	16.56 74.9	16.33 74.3	16.13 73.8	15.70 73.2
15.04 72.7	13.87 72.1	13.8 71.6	13.77 71.0	13.36 70.5	13.21 69.9	13.01 69.4
12.36 68.9	11.83 68.3	11.24 67.8	11.04 67.2	11.04 66.7	10.64 66.1	10.45 65.6
10.45 65.0	10.35 64.5	9.50 63.9	9.46 63.4	9.32 62.8	9.32 62.3	9.20 61.7
9.09 61.2	9.05 60.7	8.71 60.1	8.67 59.6	8.47 59.0	8.45 58.5	8.36 57.9
8.32 57.4	6.28 56.8	6.28 56.3	6.28 55.7	6.28 55.2	6.28 54.6	6.00 54.1
7.85 53.6	7.81 53.0	7.74 52.5	7.57 51.9	7.47 51.4	7.42 50.8	7.28 50.3
7.26 49.7	7.26 49.2	7.11 48.6	6.94 48.1	6.91 47.5	6.53 47.0	6.53 46.4
6.41 45.9	6.15 45.4	6.01 44.8	5.98 44.3	5.94 43.7	5.81 43.2	5.78 42.6
5.76 42.1	5.76 41.5	5.62 41.0	5.55 40.4	5.52 39.9	5.52 39.3	5.33 38.8
5.30 36.3	5.30 35.7	5.20 35.2	5.20 34.6	5.18 34.1	5.09 33.5	5.05 33.0
4.90 34.4	4.75 33.9	4.66 33.3	4.64 32.8	4.58 32.2	4.58 31.7	4.54 31.1
4.41 30.6	4.34 30.1	4.27 29.5	4.14 29.0	4.11 28.4	4.05 27.9	4.05 27.3
4.04 26.8	3.94 26.2	3.76 25.7	3.72 25.1	3.66 24.6	3.50 24.0	3.48 23.5
3.45 23.0	3.42 22.4	3.39 21.9	3.35 21.3	3.22 20.8	3.13 20.2	3.11 19.7
3.08 19.1	3.06 18.6	3.02 18.0	2.85 17.5	2.71 16.9	2.69 16.4	2.65 15.8
2.65 15.3	2.61 14.8	2.60 14.2	2.49 13.7	2.45 13.1	2.37 12.6	2.34 12.0
2.20 11.5	2.16 10.9	2.07 10.4	1.91 9.8	1.81 9.3	1.77 8.7	1.77 8.2
1.67 7.7	1.66 7.1	1.63 6.6	1.55 6.0	1.51 5.5	1.50 4.9	1.45 4.4
1.39 3.8	1.39 3.3	1.24 2.7	1.22 2.2	1.22 1.6	1.20 1.1	1.05 0.5

75.27425
38.18762
30.92151
26.18648
17.45766
14.40030
11.73286
10.35021
8.28163
7.27565

75.27425
38.18762
30.92151
26.18648
17.45766
14.40030
11.73286
10.35021
8.28163
7.27565

92.87251
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27.56471
18.40361
15.39824
11.83090
10.47460
8.45245
7.42117

165.60336
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7.52742

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16.13297
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10.91104
9.20019
7.52742

201.43451
52.37297
32.73311
28.53790
20.61070
16.13297
12.26692
11.04217
9.20181
7.81663

201.95537
52.37297
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21.82310
16.56033
13.24975
11.04217
9.20138
6.28163

371.05811
55.20111
33.12067
30.80763
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9.88170
8.28163

434.55005
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30.80763
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16.56033
13.24975
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10.07173
8.28163

475.63159
59.15446
37.10582
30.91606
25.87552
16.86330
13.80272
11.73286
10.35021
8.28163

7.27403
5.52109
4.77345
4.14081
3.87948
2.85429

2-36618	2-21614	2-35638	2-15600	2-15463	2-05384	1-99557	1-93233	1-76694	1-65633
1-56038	1-56038	1-50575	1-44899	1-38886	1-23686	1-20770	1-20398	1-19696	1-19323
1-10744	1-3521	1-01910							
PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL									
475.63 99.5	434.55 98.9	371.06 98.4	201.96 97.8	201.43 97.3	197.18 96.7	165.40 96.2	55.20 92.9	52.37 92.3	
92.67 95.6	75.27 95.1	75.27 94.5	59.15 94.0	55.23 93.4	55.20 92.9	52.37 92.3	38.19 89.1	37.11 88.5	
52.37 91.8	52.37 91.3	41.41 90.7	38.52 90.2	38.52 89.6	38.19 89.1	37.11 88.5	31.85 85.2	31.71 84.7	
35.23 86.0	33.12 87.4	33.12 86.9	32.73 86.3	32.73 85.8	32.73 85.8	31.85 85.2	29.10 81.4	28.56 80.9	
31.25 84.2	30.92 83.6	30.92 83.1	30.81 82.5	30.81 82.0	30.81 82.0	29.10 81.4	25.88 77.6	24.94 77.0	
28.54 80.3	27.61 79.8	27.56 79.2	26.67 78.7	26.67 78.1	26.19 78.1	25.88 77.6	17.81 73.2	17.81 73.2	
24.36 76.5	21.87 76.3	20.61 75.4	20.61 74.9	20.61 74.9	18.92 74.3	18.92 74.3	16.40 69.9	16.13 69.4	
17.46 72.7	16.86 72.1	16.63 71.6	16.56 71.0	16.56 71.0	16.56 70.5	16.56 69.9	13.80 66.1	13.36 65.6	
15.77 68.9	15.47 68.3	15.05 67.8	14.40 67.2	14.40 67.2	13.80 66.7	13.80 66.1	11.83 62.3	11.73 61.7	
13.25 65.0	12.37 64.5	12.27 63.9	11.90 63.4	11.83 62.8	11.83 62.8	11.83 62.3	10.91 58.5	10.67 57.9	
11.73 61.2	11.39 60.7	11.24 60.1	11.04 59.6	11.04 59.6	11.04 59.0	10.91 58.5	9.88 54.6	9.74 54.1	
10.47 57.4	10.35 56.8	10.35 56.3	10.35 55.7	10.35 55.7	10.07 55.2	9.88 54.6	8.28 50.8	8.28 50.3	
9.20 53.6	9.20 53.0	8.73 52.5	8.69 51.9	8.69 51.4	8.45 51.4	8.28 50.8	7.53 47.0	7.48 46.4	
8.28 49.7	8.28 49.2	8.28 48.6	7.82 48.1	7.82 48.1	7.57 47.5	7.53 47.0	6.71 43.2	6.55 42.6	
7.42 45.9	7.28 45.4	7.27 44.8	7.20 44.3	7.20 44.3	7.08 43.7	6.71 43.2	5.52 39.3	5.52 38.8	
6.55 42.1	6.51 41.5	6.16 41.0	5.87 40.4	5.87 40.4	5.87 39.9	5.52 39.3	5.10 35.0	5.10 35.0	
5.52 38.3	5.46 37.7	5.30 37.2	5.30 36.6	5.30 36.6	5.30 36.1	5.10 35.0	4.58 31.7	4.58 31.1	
5.10 34.4	4.77 33.9	4.64 33.3	4.64 32.8	4.64 32.8	4.58 32.2	4.58 31.7	4.12 27.3	4.12 27.3	
4.58 32.6	4.58 30.1	4.58 29.5	4.35 29.0	4.35 29.0	4.14 28.4	4.12 27.9	3.91 23.5	3.91 23.5	
4.05 26.6	4.05 26.2	4.04 25.7	4.01 25.1	4.01 25.1	3.94 24.6	3.94 24.0	3.50 20.2	3.50 20.2	
3.88 23.1	3.77 22.4	3.76 21.9	3.71 21.3	3.71 21.3	3.50 20.8	3.50 20.2	2.81 16.4	2.70 15.8	
3.13 19.1	3.09 18.6	3.02 18.0	2.85 17.5	2.85 17.5	2.85 16.9	2.81 16.4	2.56 12.6	2.37 12.0	
2.69 15.3	2.69 14.8	2.65 14.2	2.65 13.7	2.65 13.7	2.65 13.1	2.56 12.6	2.00 8.7	1.93 8.2	
2.21 11.5	2.16 10.9	2.16 10.4	2.15 9.8	2.15 9.8	2.05 9.3	2.00 8.7	1.45 4.9	1.39 4.4	
1.77 7.7	1.66 7.1	1.54 6.6	1.54 6.0	1.54 6.0	1.51 5.5	1.45 4.9	1.11 1.1	1.04 0.5	
1.24 3.8	1.21 3.3	1.20 2.7	1.20 2.2	1.20 2.2	1.19 1.6	1.11 1.1			
1.02 0.0									

77.24962	55.91315	48.96854	40.87117	40.34414	30.89983	29.58073	24.60178	21.70746	
20.50146	20.50148	18.83405	16.45134	11.73412	10.77902	7.73187	5.29712	4.45169	
4.35654	4.03441	4.03041	3.66776	3.19933	2.98081	2.76715	2.64856	2.63591	
2.48900	2.30842	2.30642	2.20713	2.18116	2.17075	2.16786	2.13000	2.04213	
2.13646	1.87793	1.85399	1.80013	1.78352	1.68008	1.64112	1.51026	1.49756	
1.41933	1.41255	1.32428	1.31795	1.31455	1.27744	1.27394	1.22421	1.21604	
1.15121	1.13114	1.13014	1.11612	1.08913	1.00324				
PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL									
77.25 98.5	55.91 97.7	48.97 95.5	40.81 93.9	40.34 92.4	40.34 90.9	40.30 90.9	30.90 89.4		
29.98 87.9	24.60 86.4	21.71 84.8	20.50 83.3	20.50 81.8	18.83 80.3	18.83 80.3	18.45 78.8		
11.73 77.3	1.78 75.8	10.49 74.2	7.73 72.7	7.73 71.2	5.37 71.2	4.45 69.7	4.36 68.2		
4.03 66.7	4.03 65.2	3.67 63.6	3.20 62.1	2.98 60.6	2.98 59.1	2.96 59.1	2.77 57.6		
2.65 56.1	2.64 54.5	2.49 53.0	2.31 51.5	2.31 50.0	2.21 48.5	2.21 48.5	2.18 47.0		
2.17 45.5	2.17 43.9	2.14 42.4	2.13 40.9	2.04 39.4	2.04 37.9	2.04 37.9	1.88 36.4		
1.85 34.8	1.81 33.3	1.76 31.8	1.68 30.3	1.64 28.8	1.57 27.3	1.57 27.3	1.51 25.8		
1.50 24.2	1.42 22.7	1.41 21.2	1.32 19.7	1.32 18.2	1.31 16.7	1.31 16.7	1.28 15.2		
1.27 13.6	1.27 12.1	1.22 10.6	1.22 9.1	1.22 9.1	1.16 7.6	1.13 6.1	1.13 4.5		
1.12 3.0	1.09 1.5	1.00 0.0							
122.30851	7.37486	63.65507	63.85507	48.98419	48.95555	40.80348	30.96494	29.97807	27.32201

6.30551
3.22642
2.26573
1.70085
1.27733

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1.27733

PATIENTS IMMEDIATELY ABOVE VS. PER CENT CONFIDENCE LEVEL									
	25-80411	25-80411	23-22369	18-83237	18-58071	17-07751	10-49233	8-39238	7-73119
63-86 95-5									
70-37 97-7									
29-98 86-4									
17-8 75-8									
8-59 77-3									
4-55 66-7									
3-32 56-1									
2-66 43-9									
2-37 42-4									
2-04 31-8									
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2-98 66-4</									

PARAM 1231

380.3542	124.22978	63.05457	40.5648	22.8898	21.84456	21.36305	18.30234	17.58311
17.58311	16.09920	16.09920	16.09920	15.5282	15.46913	13.48040	13.48040	13.15096
13.15096	12.75578	12.75578	11.84663	11.04985	10.45419	9.77386	9.77386	9.47012
9.47012	9.40216	9.11125	8.94600	8.40728	8.04960	7.91273	7.91273	7.80163
7.80163	7.47412	7.33353	7.28590	7.12102	6.83264	6.40892	6.31893	5.78595
5.78595	5.68727	5.36640	4.96191	4.70266	4.68098	4.59966	4.57780	4.36851
4.36851	4.4412	4.4412	4.01818	4.00557	3.74478	3.65891	3.65891	3.60266
3.60266	3.46182	3.40146	3.37311	3.32589	3.23665	3.20466	3.20466	3.20466
3.20466	3.191	2.80865	2.71200	2.68320	2.52757	2.49652	2.49652	2.31092
2.31092	2.24673	2.17557	2.13630	2.11191	2.11191	2.08057	2.08057	2.01240
2.01240	1.986	1.89965	1.85455	1.80131	1.79437	1.75831	1.75831	1.75831
1.75831	1.72480	1.62274	1.61822	1.61599	1.45660	1.39758	1.34804	1.29507
1.29507	1.24238	1.24238	1.23636	1.20736	1.14994	1.05595	1.05595	1.03955

240.04 99.2	96.70116	64.07217	40.57208	39.79886	29.12370	27.85745	22.88693	21.84651
21.36115	21.35738	21.35738	20.26318	20.26318	16.02086	12.64550	12.33765	12.08909
11.81952	11.91952	11.25733	11.06887	11.06887	10.45812	10.38362	10.13160	10.13160
10.01128	9.77644	9.77644	9.78854	8.21583	8.05119	7.80233	7.47679	7.47006
7.45025	7.33419	7.12039	6.88948	6.75640	6.45027	6.40722	6.21026	5.79625
5.75085	5.74984	5.74620	5.42856	5.30652	5.26931	4.99437	4.81460	4.60527
4.60768	4.59987	4.59696	4.57739	4.57658	4.27223	4.07354	4.00451	3.94805
3.89677	3.74512	3.60127	3.50917	3.50619	3.55956	3.41016	3.37720	3.20417
3.20417	3.20417	3.12148	2.89474	2.86233	2.78575	2.78575	2.73827	2.71699
2.65279	2.61871	2.56578	2.53420	2.53290	2.53290	2.49667	2.49674	2.39099
2.18504	2.16675	2.13612	2.13612	2.13574	2.03677	1.87256	1.83309	1.79453
1.72495	1.67792	1.67792	1.62288	1.56046	1.52553	1.50758	1.44737	1.43117
1.29519	1.28311	1.28311	1.26645	1.26227	1.26227	1.20747	1.19195	1.17055
1.14997	1.11039							

PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL

240.04 99.2	96.70116	64.07217	40.57208	39.79886	29.12370	27.85745	22.88693	21.84651
27.06 93.9	22.09 93.2	21.85 92.4	21.36 91.7	21.36 90.9	21.36 90.2	21.36 90.2	20.26 89.4	20.26 89.4
20.26 88.6	16.02 87.9	13.51 87.1	12.66 86.4	12.34 85.6	12.34 85.6	12.09 84.8	11.92 84.1	11.92 84.1
11.92 83.3	11.26 82.6	11.05 81.8	10.46 81.1	10.46 80.3	10.46 80.3	10.45 79.5	10.36 78.8	10.36 78.8
10.13 78.0	10.13 77.3	10.01 76.5	9.78 75.8	9.77 75.0	9.77 75.0	9.77 74.2	8.22 73.5	8.22 73.5
8.05 72.7	7.80 72.0	7.48 71.2	7.47 70.5	7.47 69.7	7.47 69.7	7.45 68.9	7.33 68.2	7.33 68.2
7.12 67.4	6.89 66.7	6.75 65.9	6.44 65.2	6.41 64.4	6.41 64.4	6.41 63.6	6.21 62.9	6.21 62.9
5.8 62.1	5.75 61.4	5.75 60.6	5.75 59.8	5.43 59.1	5.43 59.1	5.31 58.3	5.27 57.6	5.27 57.6
5.27 56.8	4.99 56.1	4.68 55.3	4.61 54.5	4.60 53.8	4.60 53.8	4.60 53.0	4.60 52.3	4.60 52.3
4.58 51.5	4.58 50.8	4.27 50.0	4.07 49.2	4.01 48.5	4.01 48.5	4.00 47.7	3.95 47.0	3.95 47.0
3.90 46.2	3.75 45.5	3.66 44.7	3.59 43.9	3.56 43.2	3.56 43.2	3.56 42.4	3.41 41.7	3.41 41.7
3.28 44.9	3.37 44.2	3.21 43.4	3.20 42.6	3.20 41.9	3.20 41.9	3.12 41.1	2.89 36.4	2.89 36.4
2.86 35.6	2.79 34.8	2.79 34.1	2.79 33.3	2.74 32.6	2.74 32.6	2.72 31.8	2.65 31.1	2.65 31.1
2.62 30.3	2.55 29.5	2.54 28.8	2.53 28.0	2.53 27.3	2.53 27.3	2.50 26.5	2.45 25.8	2.45 25.8
2.50 25.0	2.39 24.2	2.39 23.5	2.35 22.7	2.35 22.0	2.35 22.0	2.31 21.2	2.14 20.5	2.14 20.5
2.04 19.7	2.03 18.9	1.87 18.2	1.83 17.4	1.79 16.7	1.79 16.7	1.72 15.9	1.68 15.2	1.68 15.2
1.68 14.4	1.62 13.6	1.56 12.9	1.53 12.1	1.53 11.4	1.53 11.4	1.51 10.6	1.45 9.8	1.45 9.8
1.33 9.1	1.31 8.3	1.28 7.6	1.28 6.8	1.27 6.1	1.27 6.1	1.24 5.3	1.24 4.5	1.24 4.5
1.24 3.8	1.21 3.0	1.19 2.3	1.17 1.5	1.15 0.8	1.15 0.8	1.11 0.0		

865.94580	282.86792	143.57362	92.37343	49.73953	37.72325	35.35851	29.70114	23.80391
18.01707	17.76411	17.76091	13.88148	12.94978	11.43181	11.26 48	10.61525	10.05236
9.14930	8.75941	8.52678	8.42630	8.20317	8.16558	8.07315	7.07043	7.03666
6.69637	6.53246	6.48177	6.15238	5.92731	5.68452	5.18542	4.85287	4.80876
4.80876	4.41902	4.37376	4.22275	4.15908	4.12208	4.08218	3.71107	3.61127
3.55282	3.53522	3.35112	3.12740	2.94884	2.87167	2.81466	2.36474	2.35681
2.11966	1.91352	1.90978	1.87644	1.80563	1.77609	1.75916	1.62507	1.60692
1.56370	1.54578	1.40733	1.40733	1.40733	1.38626	1.35970	1.29498	1.26864
1.17860	1.13147	1.13147	1.11006	1.08204	1.06585	1.06585	1.01346	1.01006

PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL

865.95 98.9	282.87 97.8	143.57 96.7	92.37 95.6	49.74 94.4	37.72 93.3	35.36 92.2		
29.94 91.1	29.70 90.1	23.87 88.9	18.02 87.2	17.76 86.7	17.76 85.6	13.88 84.4		
12.95 83.3	11.43 82.2	11.26 81.1	11.02 80.0	10.42 79.9	10.05 77.8	9.15 76.7		
8.76 75.6	8.53 74.4	8.43 73.3	8.20 72.2	8.17 71.1	8.07 70.0	7.07 68.9		
7.07 67.8	7.04 66.7	6.70 65.6	6.53 64.4	6.46 63.3	6.15 62.2	5.92 61.1		
5.68 60.0	5.19 58.9	5.15 57.8	4.85 56.7	4.81 55.6	4.81 54.4	4.42 53.3		
4.37 52.2	4.22 51.1	4.16 50.0	4.12 48.9	4.08 47.8	3.81 46.7	3.71 45.6		
3.61 44.4	3.55 43.3	3.54 42.2	3.35 41.1	3.33 40.0	2.95 38.9	2.87 37.8		
2.81 36.7	2.78 35.6	2.36 34.4	2.36 33.3	2.12 32.2	1.91 31.1	1.91 30.0		
1.88 28.9	1.81 27.8	1.78 26.7	1.76 25.6	1.69 24.4	1.63 23.3	1.61 22.2		

APPENDIX A

1.56 21.1	1.55 20.0	1.41 18.9	1.41 17.8	1.41 16.7	1.39 15.6	1.39 14.4
1.36 13.5	1.29 12.4	1.27 11.1	1.18 10.0	1.13 8.9	1.13 7.8	1.11 6.7
1.18 5.6	1.17 4.4	1.07 3.3	1.05 2.2	1.01 1.1	1.01 0.0	
546.56909	224.74005	92.38164	49.74396	28.13916	23.81023	23.80603
23.59770	12.79053	11.37205	10.05147	9.37972	8.89917	8.76173
8.75465	8.52754	8.17366	7.10753	7.03603	6.92949	6.69473
6.51746	6.46752	5.87957	5.6802	5.56198	5.30928	5.15396
5.11179	4.88810	4.85243	4.44958	4.39774	4.12317	4.11983
3.61058	3.05059	3.12712	3.0165	3.02572	2.96639	2.81392
2.66790	2.66532	2.8155	2.04539	2.02254	2.00994	2.81441
1.71138	1.56356	1.56329	1.49258	1.48319	1.40721	1.75870
1.38614	1.27131	1.23259	1.11240	1.11240	1.06613	1.38614
546.57 95.9	224.74 97.8	92.38 96.7	49.74 94.4	28.13 92.2	23.81 90.3	23.80 92.2
23.61 91.1	12.79 88.9	11.37 86.7	10.05 84.6	9.38 82.2	8.89 80.0	8.76 77.8
10.05 83.3	9.38 82.2	8.91 81.1	8.90 80.0	7.11 72.2	6.93 70.0	6.75 68.9
8.53 75.6	8.17 74.4	7.22 73.3	7.11 72.2	7.04 71.1	6.93 70.0	6.70 68.9
6.70 67.8	6.69 66.7	6.52 65.6	6.47 64.4	5.88 63.3	5.77 62.2	5.69 61.1
5.56 60.0	5.51 58.9	5.23 57.8	5.15 56.7	5.15 55.6	5.15 54.4	4.89 53.3
4.85 52.2	4.55 51.1	4.45 50.0	4.40 48.9	4.12 47.8	4.12 46.7	4.12 45.6
3.82 44.4	3.82 43.3	3.81 42.2	3.55 41.1	3.13 40.0	3.03 38.9	3.03 37.8
2.97 36.7	2.95 35.6	2.81 34.4	2.81 33.3	2.67 32.2	2.67 31.1	2.28 30.0
2.27 28.9	2.05 27.8	2.02 26.7	2.01 25.6	1.88 24.4	1.76 23.3	1.76 22.2
1.71 21.1	1.56 20.0	1.56 18.9	1.55 17.8	1.49 16.7	1.48 15.6	1.41 14.4
1.41 13.3	1.41 12.2	1.39 11.1	1.39 10.0	1.27 8.9	1.22 7.8	1.20 6.7
1.11 5.6	1.11 4.4	1.08 3.3	1.07 2.2	1.07 1.1	1.07 0.0	
PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL						
57.30559	47.16605	36.16063	28.79031	25.40321	22.04060	21.59273
12.27977	6.19897	4.71661	4.71661	4.65116	3.13416	3.08468
2.69909	2.58290	2.54715	2.54032	2.16964	1.94415	1.91935
1.74503	1.66098	1.49493	1.48915	1.43264	1.29054	1.21620
1.01127	1.00495					1.07448
57.31 97.6	47.17 95.2	36.17 92.9	28.79 90.5	25.40 88.1	22.04 85.7	21.59 83.3
22.04 81.0	21.59 78.6	12.61 76.2	12.28 73.8	9.05 71.4	6.20 69.0	4.72 66.7
4.72 64.3	4.65 61.9	3.26 59.5	3.13 57.1	3.06 54.8	2.73 52.4	2.70 50.0
2.58 47.6	2.55 45.2	2.55 42.9	2.54 40.5	2.17 38.1	2.04 35.7	1.94 33.3
1.92 31.0	1.85 28.6	1.75 26.2	1.66 23.8	1.65 21.4	1.49 19.0	1.49 16.7
1.43 14.3	1.32 11.9	1.29 9.5	1.22 7.1	1.07 4.8	1.01 2.4	1.00 0.0
PARAMETERS IMMEDIATELY ABOVE VS PER CENT CONFIDENCE LEVEL						
74.72659	74.72659	57.30051	36.23682	31.97365	27.17761	22.03865
12.27849	9.04745	7.47266	7.47266	4.65158	4.04403	3.88252
3.39720	3.25610	2.73612	2.41579	2.09059	1.97822	1.87432
1.65290	1.61620	1.59217	1.49479	1.47180	1.32232	1.30268
1.07438	1.01118					
74.73 97.6	74.73 95.2	57.30 92.9	36.24 88.1	31.97 85.7	27.18 83.3	22.04 80.9

APPENDIX A

27.18 81.0	22.4 78.6	19.99 76.2	12.28 73.8	9.82 71.4	9.05 69.0	7.47 66.7
7.47 64.3	4.65 61.9	4.09 59.5	4.04 57.1	3.88 54.8	3.44 52.4	3.40 50.0
3.26 47.6	3.20 45.2	2.73 42.9	2.42 40.5	2.09 38.1	2.02 35.7	1.98 33.3
1.87 31.0	1.75 28.6	1.65 26.2	1.62 23.8	1.59 21.4	1.54 19.0	1.49 16.7
1.47 14.3	1.43 11.9	1.32 9.5	1.30 7.1	1.23 4.8	1.07 2.4	1.01 0.0

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